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THE UNIVERSITY OF ALBERTA
FINANCING HIGHER EDUCATION IN ALBERTA
DURING THE 1960S AND 1970S

BY



RAYMOND JOSEPH PROTTI

A THESIS

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ABSTRACT

During the 1960s, higher education institutions in Alberta underwent rapid expansion as a result of a rapid increase in the number of qualified entrants and a number of associated factors. Such enrollment pressures generated substantial expenditure needs which were met in large part by ever increasing government support. The scenario for the 1970s will not be much different as population and participation forecasts indicate a continuing demand for higher education throughout the period.

The rationale for government sector support is examined in terms of three general economic objectives of public policy. There would appear to be little justification for government support in terms of stability and income redistribution arguments. Justification is possible on the basis of economic growth objectives though the degree of support is still open to question.

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Chapter I

INTRODUCTION AND SETTING

A. Introduction

This thesis is written with the intention of providing a perspective of post-secondary education in Alberta¹. For the purposes of this study post-secondary education refers to that level of education provided by the three universities and their affiliated colleges and the junior colleges in the province. Technical and vocational institutions are not covered in this analysis. Since much of the statistical material used in this analysis comes from the Dominion Bureau of Statistics, it is useful to know that their definition of institutions of higher education covers all universities and colleges which offer one or more years of degree-credit courses beyond the most advanced high school grade in the province in which they are located.² The institutions specifically covered by D. B. S. and this study are listed in Chapter 2.

¹ The terms post-secondary education and higher education will be used interchangeably in this thesis.

² Canada, Dominion Bureau of Statistics, Canadian Universities Income and Expenditure, 1966-67, p. 7.

The general approach taken here is very similar to that used by the Commission to the Association of Universities and Colleges of Canada in 1965¹. Appointment of the Bladen Commission by the Canadian Universities Foundation was motivated by the mounting financial crisis at the university level - a crisis due in part to the "baby boom" and in part to rising rates of participation of the university age group². That Commission was charged with preparing recommendations on the financing of universities and colleges in Canada to the end of 1975. Particular reference was made to the prospective financial requirements of these institutions and to the question of the proportions of funds to be provided through tuition fees, government grants and foundation gifts. The Bladen report provides, for the nation, estimates of projected enrollment and of the operating and capital costs associated with the increase in enrollment. The Commission also briefly discussed the pricing of education and provided a short resume of the benefits of higher education to the individual and to society.

¹ Association of Universities and Colleges of Canada, Financing Higher Education in Canada, A Report Prepared by a Commission to the Association, (Toronto: University of Toronto Press, 1965). Hereinafter cited as the Bladen Report.

² Ibid., p. 9.

This study is designed to review what has happened in the last decade in Alberta in terms of enrollments, expenditures and income and to project trends in these areas to the 1970s. Following this analysis will be a discussion of the question of who should pay for higher education. A concluding chapter will summarize the main findings and conclusions of the earlier chapters. Though none of the separate chapters are intended to be a definitive analysis of their individual concerns, they are intended to be complete enough to provide some idea of the order of magnitude of the problems.

The universities and junior colleges in Alberta are faced with rapidly-rising enrollments, higher costs and hard-pressed sources of revenue¹. Chapters 2 and 3 concern themselves with these questions. Chapter 2 focuses attention on the problem of enrollment. Brief sections are directed to reviewing the data sources and the methodology of projecting enrollment trends. A review of developments in the 1960s is provided along with a population analysis. Projections of undergraduate, graduate and total enrollment are

¹ For elaboration see: Alberta, Universities Commission, University Enrollment and Operating Cost Estimate, (Edmonton: 1966), p. 2.

prepared on the basis of various population and enrollment trend assumptions.

Chapter 3 draws attention to the financial position of the universities and colleges. Both the operating and capital expenditures and income of these institutions is reviewed for the 1960s. Trends based on the experience of the 1960s are projected forward along with the enrollment projections of Chapter 2 to provide some general idea of the size of expenditures expected in the coming decade. Analysis of the suppliers of funds to the universities and colleges is also undertaken and some estimates are provided of the sums of money that will be required from them to finance the anticipated expansion. Particular attention is given to the contributions of the government sector.

The troublesome question of the pricing of education is considered in Chapter 4. It is cast in a framework which provides an opportunity to discuss expenditures on education in terms of stability (stabilization objectives), income redistribution and economic growth. A review of recent literature in the field is undertaken to provide support for a discussion of the costs and benefits in higher education.

A brief final chapter summarizes the study's main conclusions and offers some comments on the non-economic objectives of

government involvement in the financing of higher education.

The remainder of this chapter will be devoted to providing a setting as well as a perspective within which the material of Chapters 2, 3, and 4 might be digested. To this end a review and updating of the main findings of the Bladen report is undertaken. This exercise provides a national framework within which the Alberta analysis may be fitted. A short review of the revenue-expenditure position of the Alberta government over the last decade is also provided. This is intended to provide a boundary or framework within which provincial government support to higher education can be analysed.

B. The Setting

1. National

(a) Enrollment

The Bladen report notes a tripling of enrollment within twelve years. Table I-1 indicates that in the fall of 1952-53 enrolled students numbered 63,000; by 1959-60 this had risen to over 10,000; and in 1964-65 it stood at 180,000. Since that time enrollment has increased 45% to 261,000 in 1967-68. The Commission projected an enrollment of 340,000 students in 1970-71 and 461,000

Table I-1

FULL-TIME FALL ENROLLMENT IN CANADIAN
UNIVERSITIES AND COLLEGES
GRADUATE AND UNDERGRADUATE, 1951-52 TO 1967-68

(Thousands)

<u>Academic Year</u>	<u>Undergraduate</u>	<u>Graduate</u>	<u>Total</u>	<u>% of Total Enrolment Formed By Graduate Students</u>
1951-52	60.4	3.1	63.5	4.9
1952-53	59.8	3.2	63.0	5.1
1953-54	61.0	3.1	64.1	4.8
1954-55	65.0	3.3	68.3	4.8
1955-56	69.3	3.4	72.7	4.7
1956-57	75.0	3.5	78.5	4.5
1957-58	82.6	4.1	86.7	4.7
1958-59	90.4	4.6	95.0	4.8
1959-60	96.7	5.2	101.9	5.1
1960-61	107.4	6.5	113.9	5.7
1961-62	121.6	7.3	128.9	5.7
1962-63	133.0	8.4	141.4	5.9
1963-64	147.3	11.1	158.4	7.0
1964-65	164.4	13.8	178.2	7.7
1965-66	188.7	17.2	205.9	8.4
1966-67	213.0	19.7	232.7	8.5
1967-68	237.0	24.2	261.2	9.3

Source: Bladen Report, op. cit., p. 94; Z. E. Zsigmond C. J. Wenaas, Enrollment in Educational Institutions by Province, 1951-52 to 1980-81, Economic Council of Canada, Staff Study No. 25, (Ottawa: Queen's Printer, 1970), p. 95.

by 1975-76¹. The most recent enrollment projections of the Economic Council of Canada now forecast that university and college enrollment will total 560,000 by 1975-76 and will increase 34% to total 750,000 by 1980-81². The Council's most recent estimate for 1975-76 represents an increase of 21.5% over the comparable Bladen estimate. The change in the forecast is accounted for in large part by different projected rates of participation of the 18-24 age group. The Bladen report forecast a 15.6% rate of participation by this group in 1975-76³. The staff study estimate places this rate at 18% in 1975-76⁴.

(b) Costs and Revenues

Table I-2 outlines the Commissions findings on the questions of university operating and capital expenditures. Both the actual statistics and the Commission projections are provided for 1964-65 to 1967-68 in current as well as constant dollars. It can be seen that though the rise in operating expenditure has

¹ Bladen Report, op. cit., p. 16.

² Z. E. Zsigmond and C. J. Wenaas, Enrollment in Educational Institutions by Province 1951-52 to 1980-81, Economic Council of Canada, Staff Study No. 25, (Ottawa: Queen's Printer, 1970), p. 95.

³ Bladen Report, op. cit., p. 18.

⁴ Zsigmond and Wenaas, op. cit., p. 38.

Table I-2

OPERATING, CAPITAL AND TOTAL EXPENDITURES OF
UNIVERSITIES AND COLLEGES OF CANADA
1954-55 TO 1967-68, ACTUAL AND PROJECTED

(\$ Millions)

<u>Academic Year</u>	<u>Operating Expenditure</u>	<u>Capital Expenditure</u>	<u>Total Expenditure</u>
1954-55	76	12	88
1955-56	80	16	96
1956-57	87	20	107
1957-58	103	40	143
1958-59	121	52	173
1959-60	143	69	212
1960-61	176	79	255
1961-62	206	85	291
1962-63	239	113	352
1963-64	284	145	429
1964-65	337	200	537
1965-66	345	218	563
1966-67	(407) 432	(247) 252	(654) 684
1967-68	(492) 579	(263) 309	(755) 888
1968-69	(579) 739	(289) 358	(868) 1,097

Constant Dollars¹

1954-55	105	13	118
1955-56	108	16	124
1956-57	114	18	130
1957-58	133	39	172
1958-59	137	51	188
1959-60	153	67	220
1960-61	184	76	260
1961-62	206	85	291
1962-63	232	111	343
1963-64	268	136	404
1964-65	317	199	516
1965-66	(355) 377	(210) 215	(565) 592
1966-67	(402) 473	(211) 247	(613) 720
1967-68	(442) 565	(233) 279	(675) 844

Source: Bladen Report, Table VII, p. 23; Canada, Dominion Bureau of Statistics, Daily Bulletin, October 21, 1969. Parentheses indicate Bladen Report projections.

¹ See Chapter 3 for a description of deflator.

been dramatic it has been more than matched by the increase in capital spending. Operating expenditures in current dollars increased from \$76 million in 1954-55 to over \$739 million in 1967-68, a rise of 872%.

Capital expenditures, on the other hand, rose from \$12 million in 1954-55 to \$358 million by 1967-68, a jump of almost 3,000%. In constant dollar terms, operating expenditures show an average annual increase of 14.9% while capital expenditures show an increase of 28.1%.

On the operating income side, the Bladen Commission found that there had been at the time no trend towards heavier reliance on any particular source of support¹. In 1963-64, students paid through fees 27% of the cost, the federal government about 19%, the provincial governments about 40%, and other sources about 14%. Since that time it would appear there is less reliance on fees as a means of financing operating expenditures. In 1967-68, students contributed 19.5% of total operating income with the government sector financing about 70% of the total. The other component represents almost 11% of operating income.

The government sector has played just as dominant a role as a source of capital funds for Canadian universities and colleges.

¹ Bladen Report, op. cit., p. 30.

Table I-3

OPERATING INCOME OF CANADIAN UNIVERSITIES AND COLLEGES
BY SOURCES INCLUDING SPONSORED RESEARCH IN MILLIONS OF
DOLLARS, 1954-55 TO 1967-68

<u>Academic Year</u>	<u>Fees</u>	<u>Federal Government Including Research</u>	<u>Provincial Governments Including Research</u>	<u>Other</u>	<u>Total</u>
1954-55	21.3	10.8	30.6	13.0	75.8
1955-56	21.6	12.1	32.8	13.8	80.3
1956-57	25.1	17.8	31.8	16.1	90.8
1957-58	30.9	19.3	37.5	15.0	102.7
1958-59	33.5	28.2	42.3	16.4	120.4
1959-60	40.8	31.1	50.3	20.4	142.5
1960-61	46.0	32.7	77.3	20.8	176.8
1961-62	56.2	36.4	78.9	33.5	205.1
1962-63	62.4	45.2	91.5	35.9	235.0
1963-64	75.6	50.6	110.8	39.8	276.8
1964-65	89.7	63.1	136.7	53.3	342.8
1965-66	110.6	73.1	183.2	59.3	426.3
1966-67	130.0	133.7	249.1	68.8	500.9
1967-68	144.5	83.8	435.6	76.8	740.6

Source: Bladen Report, op. cit., Table IXA, p. 29; Canada,
Dominion Bureau of Statistics, Canadian Universities
Income and Expenditure (Annual). Selected years.

Table I-4 indicates that though the contributions from the federal

Table I-4

SOURCE OF CAPITAL FUNDS OF CANADIAN
UNIVERSITIES AND COLLEGES
SELECTED YEARS

	<u>1963-64</u>	<u>1965-66</u>	<u>1967-68</u>
	(millions of dollars)		
Federal Government	11.2	7.0	17.6
Provincial Government	88.6	163.4	247.7
Other	<u>46.1</u>	<u>86.3</u>	<u>90.0</u>
Total	145.9	256.7	355.3
	(per cent)		
Federal Government	7.7	2.7	5.0
Provincial Government	60.7	63.7	69.7
Other	<u>31.6</u>	<u>33.6</u>	<u>25.3</u>
Total	100.0	100.0	100.0

Source: Bladen Report, op. cit., Table X; and, Dominion Bureau of Statistics, Daily Bulletin, op. cit.

government have fluctuated over the years considered, provincial government contributions have risen steadily to 1967-68 where they accounted for almost 70% of total funds.

2. Provincial

The following review will cast expenditures on education of the provincial government in the context of the province's total expenditures and on the basis of selected economic indicators.

Table I-5 indicates the increasing importance of the operating and capital grants of the universities and colleges in the context of provincial net general expenditure. Whereas in 1959-60 such grants amounted to less than 10% of net general expenditure, by 1967-68 they amounted to over 17%.

In terms of personal income, over the last decade operating and capital expenditures have shown steady growth as a percentage of personal income. In 1959-60 such expenditures represented 1.0% of personal income within the province, by 1964-65 it was 1.6% and by 1967-68 they represented 3.0% of personal income.

As Table I-6 demonstrates for the most recent years, provincial government expenditures on education, and higher education in particular, continue to grow relatively more quickly than total provincial government expenditures. In 1970-71, education expenditures are projected to account for over 36% of government expenditures, whereas in 1968-69 they accounted for just over 34%. It is interesting to note that in 1970-71 expenditures on higher education by the Alberta government will account for 14.5% of the total budget or almost 40%

Table I-5

ALBERTA GOVERNMENT SUPPORT OF UNIVERSITIES AND COLLEGES

	(Millions of Dollars)		Personal Income in the Province ²	Provincial Government Support As a % of Net General Expenditure		As a % of Personal Income
	Total Operating And Capital Expenditures	Provincial Net General Expenditure ¹				
1959-60	20.6	234.7	2,085	8.8		1.0
1960-61	24.1	266.3	2,145	9.0		1.1
1961-62	20.8	279.1	2,343	7.5		0.9
1962-63	29.9	282.3	2,479	10.6		1.2
1963-64	34.8	310.8	2,602	11.2		1.3
1964-65	46.6	379.6	2,888	12.3		1.6
1965-66	59.2	529.0	3,337	12.0		1.8
1966-67	88.8	597.2	3,604	14.9		2.5
1967-68	119.4	691.0	4,036	17.3		3.0

Source: See Table III-3, Chapter 3.

¹ Unpublished statistics of the Federal-Provincial Tax Structure Committee.

² Unpublished material obtained from the Dominion Bureau of Statistics. Statistics are on a calendar year basis.

of the total education budget.

Table I-6

ALBERTA GOVERNMENT EXPENDITURES
ON HIGHER EDUCATION

	(Millions of Dollars)			(Percentage of Total)		
	<u>1968/69</u>	<u>1969/70</u>	<u>1970/71</u>	<u>1968/69</u>	<u>1969/70</u>	<u>1970/71</u>
Total Education Expenditures	274.5	307.4	387.0	34.4	34.0	36.3
Total Higher Education Expenditures	103.3	120.2	154.9	13.0	13.3	14.5
Total Budgetary Expenditures	797.3	904.2	1,067.2	100.0	100.0	100.0

Source: Alberta, Public Accounts 1968-69, (Edmonton: Queen's Printer, 1969). Alberta, Estimates, 1969-70, 1970-71, (Edmonton: Queen's Printer, 1969 and 1970).

Chapter II

A FORECAST OF THE DEMAND FOR HIGHER EDUCATION IN ALBERTA

A. Introduction

This chapter focuses attention on a forecast of the demand for places at the university and college level through the next decade. The methodology employed in forecasting this demand is reviewed and is followed by a discussion of the population and enrollment statistics used as a base for forecasting purposes. Subsequent sections deal with the projections themselves. The concluding paragraphs speculate on the reasonableness of the estimates and offer some national and inter-provincial comparative statistics.

B. Methodology

The projections in this chapter reflect "needs" for university facilities in the next decade and not a true demand.¹ The concept of the demand for education as it is presently used in most surveys is beset with ambiguity.² What is really being studied and measured

¹ Though need is what in fact is being measured, the term "demand" for education will be employed in subsequent sections to facilitate discussion.

² Criticism of the concept of the demand for education can be found in: Theodore W. Schultz, "Resources for Higher Education, An Economist's View", Journal of Political Economy, Vol. 76, (May-June, 1968), pp. 327-347.

in most reviews and projections is a "need" and not a demand. The concept of demand implies prices and quantities. However, projections done to date do not reflect relevant prices in the numbers which are being projected. Projections reflecting "need" and not demand result in part from the fact that little has been done to analyse the economic demands related to education in terms of the factors that determine changes in these demands. Moreover, as Schultz indicates, further limitations are raised by the fact that there is as yet no economic theory for determining the changes in the demands for higher education that are derived from our type of economic growth.¹

The method employed in projecting enrollments must capture the influence of demographic and socio-economic factors on the educational system. Demographic factors, or what others have called the macro-economic determinants of the demand for education,² refer to the study of the size, spatial distribution, and composition of population, and changes in it. Total population, and more particularly total population within a specified age group, serves as a frame or upper bound on the total demand for higher education. The influence

¹ Ibid., p. 335.

² H. Correa, The Economics of Human Resources, (New Amsterdam: North Holland Publishing Co., 1968). Chapter 2.

of population structure on the demand for education is similar to the influence of this structure on labour supply. For example, changes in natality or mortality affect the age structure. A reduction in the birth rate tends to decrease the proportions of people later entering into higher education. Moreover, age factors are important in that the bulk of university students are within a determined population interval¹.

Other demographic factors play a more minor role. Population shifts among groups with different enrollment rates, such as ethnic and racial groups, might have an effect on enrollment numbers. Migratory movements can be expected to have some influence on enrollment patterns. One American study shows that relatively large numbers of young persons crossed state lines to attend college or university.² In Canada, Illing and Zsigmond have calculated interprovincial flows between provinces

¹ The sex factor in the population structure has some importance in forecasting the demand for higher education. This analysis concentrates, however, on total figures. For a study taking account of the sex factor see, Wolfgang M. Illing and Zoltan E. Zsigmond, Enrollment in Schools and Universities, 1951-52 to 1975-65. Economic Council of Canada, Staff Study, No. 20, (Ottawa: Queen's Printer, 1967).

² American Association of College Registrars and Admission Officers, Home State and Migration of American College Students, Fall, 1958, (New York: Columbia University Press, 1959).

and it is notable that Alberta in 1965-66 had a net outflow of 601 students.¹

Socio-economic factors also have a substantial influence on the demand for higher education. Such factors influence the rate of participation in university and college education. Intellectual capacity, location, parental influence, motivation and personal income and education costs are some of the variables included under the broad category of socio-economic factors. Most of these influences on the rates of participation are not readily measurable but one may estimate their influence on the demand for higher education by selecting a range or series of rates of participation that would appear plausible for the next decade. In Alberta, as well as in all of Canada, "there is a growing tendency to consider higher education as an indispensable prerequisite for meeting the specialized demands of a rapidly changing world. Higher incomes, greater availability of scholarships and loans play an instrumental role in this process".² It is likely that such tendencies will still be very much in evidence in the decade ahead.

To capture demographic and socio-economic influences, the method employed here in projecting enrollments involves assessing

¹ Illing and Zsigmond, op. cit., p. 42-43.

² Ibid., p. 48.

the flow of students through the educational system and estimating the demand for places based on past trends and past educational policy.¹

The techniques employed here to make use of past information involve least-squares analysis. Enrollment is projected as a percentage of a reference group that is closely correlated to the demand for university and college places. The base reference group chosen for total projection purposes is the 18-24 age group. This seven-year age bracket traditionally² is used to standardize enrollment at the post-secondary level. Projections for undergraduate enrollment employ the 18-21 age group.

It is fair to note that there are limitations in extrapolating a curve beyond the range of the observed data³- the technique employed

¹ It is an implicit assumption of this type of analysis that major policy variables such as entrance requirements will not be changed.

² Illing and Zsigmond regard this range as probably the "optimum" age bracket since it takes in the majority of observations in the actual frequency distribution of students by age and since at the same time it minimizes the effects of irregular growth of single-year age groups. See Illing and Zsigmond, op. cit., pp. 48-49. In this regard see also Cicely Watson and Saeed Quazi, Ontario University and College Enrollment Projections to 1981/82, (1968 Projection). (Toronto: Ontario Institute for Studies in Education, 1968), pp. 1-2.

³ For a discussion of these limitations, see Mordecai Ezekiel and Karl A. Fox, Methods of Correlation and Regression Analysis, (New York: John Wiley and Sons, Inc. 1959), Section V.

in this chapter to project enrollment. Techniques used to determine the lie or curve of a relationship give, in fact, no statistical basis for estimating beyond the limits of the values of the independent variable actually observed. In those instances where a formula has been used which has a good logical basis, extrapolation may give a result which is logical to expect. However, the reasonableness of the extrapolation rests on the validity of the logic rather than on a statistical basis. The logic in this analysis rests in the main on the reasonableness of the projected rates of participation. To the extent that the influences that have operated on this rate in the last decade are operative in about the same magnitude in the 1970s and assuming that they have been adequately captured and properly weighted, then it is reasonable to expect that the rates and the resulting enrollment projections will be within the range of those forecast.

C. Data

(i) Population Statistics

Tables II-1 and II-2 provide forecasts for the next decade of the expected total population in the 18-21 and 18-24 age groups. The first forecast in both tables assumes no net immigration while the second for both tables assumes net immigration of 5,000 per annum.

Table II-1

PROJECTED POPULATION FOR
18-21 AGE GROUP

	<u>Year</u>	<u>Forecast 1</u>	<u>D. B. S. Estimate</u>	<u>Forecast 2</u>
	1959		69.0	
	1960		70.7	
A	1961		73.6	
C	1962		75.8	
T	1963		79.2	
U	1964		82.2	
A	1965		86.5	
L	1966		93.6	
	1967		96.4	
	1968		102.0	
	1969		108.0	
	1970	105,694		106,809
P	1971	109,685		111,017
R	1972	115,883		117,454
O	1973	122,182		124,012
J	1974	128,831		130,940
E	1975	133,291		135,678
C	1976	136,225		138,921
T	1977	139,686		142,718
E	1978	141,626		145,027
D	1979	144,318		148,116
	1980	145,537		149,732

Source: Alberta, Alberta Bureau of Statistics, Population, 1961 and 1966, Forecast, 1971-1976-1981-1986. (Edmonton: April, 1968).

Table II-2

PROJECTED POPULATION FOR 18-24 AGE GROUP

(In Thousands)

	<u>Year</u>	<u>Forecast 1</u>	<u>D. B. S. Estimate</u>	<u>Forecast 2</u>
	1959		121.2	
	1960		123.6	
A	1961		126.7	
C	1962		130.2	
T	1963		135.0	
U	1964		138.5	
A	1965		143.7	
L	1966		153.0	
	1967		158.0	
	1968		167.8	
	1969		178.8	
	1970	178,190		181,058
P	1971	185,775		189,114
R	1972	192,540		196,268
O	1973	199,620		203,756
J	1974	208,768		213,330
E	1975	216,601		221,611
C	1976	225,496		231,002
T	1977	233,542		239,593
E	1978	240,629		247,257
D	1979	244,973		252,205
	1980	248,796		256,655

Source: Alberta, Alberta Bureau of Statistics, Population 1961 and 1966, Forecast, 1971-1976-1981-1986, (Edmonton: April, 1968).

Age-specific fertility rates used in preparing the forecasts are the same for both tables. The rates used are higher than the lowest rates of recent years but considerably lower than those of the immediate post-war period.

In a study prepared for the Board of Post-Secondary Education, Hanson uses an average net immigration of 5,000, assuming a substantial level of investment in petroleum and other industries.¹ Table II-3 provides an estimate of net interprovincial immigrants based on the change of addresses of recipients of family allowance. The figures indicate the variations in year-to-year behaviour. To the extent that the province of Alberta grows relative to other Canadian regions over the next decade, the more likely is it that the second forecast will be the more accurate of the two projections.

It is worth noting that the projections of the Alberta Bureau of Statistics published in 1968 for the year 1970 are very close to estimates for 1969 provided by D. B. S. The closeness of the estimates is probably accounted for by the considerable rise in migration from 1966-67 to 1968-69.

¹ E. J. Hanson, Population Analysis and Projections, College Areas, Alberta. A Report Prepared for the Board of Post-Secondary Education, (Edmonton: The Board of Post-Secondary Education, 1968). This study includes a detailed review of population trends and projections according to college areas.

Table II-3

ESTIMATED NET INTERPROVINCIAL MIGRANTS, FOR THE PROVINCES,
CENSUS YEARS 1962-1969

	<u>1962- 1963</u>	<u>1963- 1964</u>	<u>1964- 1965</u>	<u>1965- 1966</u>	<u>1966- 1967</u>	<u>1967- 1968</u>	<u>1968- 1969</u>
Newfoundland	- 900	- 2,500	- 3,900	- 3,400	- 3,100	- 1,200	- 500
Prince Edward Island	- 500	- 600	- 1,600	- 1,000	- 600	-	- 400
Nova Scotia	- 6,900	- 7,500	- 9,600	- 9,400	- 7,300	- 3,300	- 2,400
New Brunswick	- 4,400	- 5,400	- 3,700	- 4,400	- 3,400	+ 100	- 2,800
Quebec	+ 4,700	- 2,000	- 1,700	- 4,500	-10,000	-13,300	-14,400
Ontario	+ 8,000	+14,000	+18,700	+18,800	+16,400	+ 4,900	+ 8,400
Manitoba	- 2,200	- 5,000	- 8,400	-15,600	-13,900	- 8,500	- 7,600
Saskatchewan	-12,200	- 6,100	- 4,800	- 8,200	- 9,900	- 8,200	-13,400
Alberta	+ 3,400	- 2,900	- 7,500	-13,300	- 2,300	+ 4,600	+ 6,800
British Columbia	+11,700	+18,600	+24,200	+41,500	+34,700	+24,300	+26,100
Yukon	- 300	- 200	- 700	- 200	- 200	+ 200	+ 100
Northwest Territories	- 400	- 400	- 1,000	- 300	- 400	+ 400	+ 200

- Less than 50.

Source: Special Dominion Bureau of Statistics preparation, (December, 1969).

(ii) Enrollment Figures

The enrollment figures used in this chapter are drawn from the annual document Survey of Higher Education - Part One, published by the Dominion Bureau of Statistics. The figures relate to fall enrollment in universities and colleges as of December 1. Data are not included for enrollment in second or third terms or semesters at those institutions which admit more students after that date. A full-time student is taken to be one for whom attendance at university is the primary occupation. The following institutions are covered in the Alberta enrollment figures:

Canadian Union College	Red Deer Junior College
College Saint-Jean	St. Joseph's College
Concordia College	St. Stephen's College
St. Joseph's Seminary	University of Calgary
University of Alberta	Medicine Hat Junior College
Camrose Lutheran Junior College	Mount Royal Junior College
Grande Prairie Junior College	University of Lethbridge

Table II-4 provides a review of trends in graduate and undergraduate enrollment in Alberta universities and colleges since 1959. Over the last eleven years, total enrollment has increased almost five-fold. Over the same period, graduate enrollment increased ten-fold while undergraduate enrollment increased four and one-half times.

Table II-4

PROVINCE OF ALBERTA
FULL-TIME UNIVERSITY AND COLLEGE ENROLLMENT
1959-60 - 1969-70

<u>Academic Year</u>	<u>Undergraduate</u>	<u>Graduate</u>	<u>Total</u>
1959-60	5,921	294	6,215
60-61	6,918	350	7,268
61-62	8,028	471	8,499
62-63	9,181	656	9,837
63-64	10,254	825	11,079
64-65	11,929	1,048	12,977
65-66	13,445	1,304	14,749
66-67	15,380	1,603	16,983
67-68	17,724	1,924	19,688
68-69	22,455	2,467	24,922
69-70	26,950	3,050	30,000

Source: Canada, Dominion Bureau of Statistics, Survey of Higher Education - Part I (No. 81-204), Selected years; and, Canada, Dominion Bureau of Statistics, Advance Statistics of Education 1969-70, (No. 81-220).

D. Projections

(i) Total Enrollment

Chart 1¹ provides two estimates of the percentage of the 18-24 age group expected to be attending university for the next decade. In 1959, enrollment equalled 5.13% of the 18-24 age group. This proportion has risen steadily to an estimated 16.78% in 1969-70. The estimate based on an eleven-year trend forecasts that 26.33% of 18-24 age group will be in full-time attendance at universities and colleges by 1980. The second estimate based on a six-year trend forecasts a 31.63% participation rate by 1980.

On the basis of the two projections of rates of participation and two population estimates [Table II-2], four estimates are provided for total university enrollment to the end of this decade.

Chart 2 graphically portrays the projected enrollment figures to 1980 based on both the six and eleven-year time spans.²

¹ Based on Appendix - Tables A-1 and A-2.

² Time trends and enrollments in 1970-71 are somewhat low relative to 1969-70 figures because of the projection techniques employed. A generally fitted straight line lies to some extent above or below the last observed point. If the next reading is taken on that line, it can result in a rise or drop from the last actual reading. A method of offsetting this rise by fitting a line through the last actual ratio and the ratio in the target year (i. e. 1980) has been employed elsewhere. See Cicely Watson and Saeed Quazi, op. cit. It is not used here.

ENROLLMENT IN ALBERTA UNIVERSITIES AND COLLEGES AS A PERCENTAGE OF THE 18-24 AGE GROUP ACTUAL AND PROJECTED

28

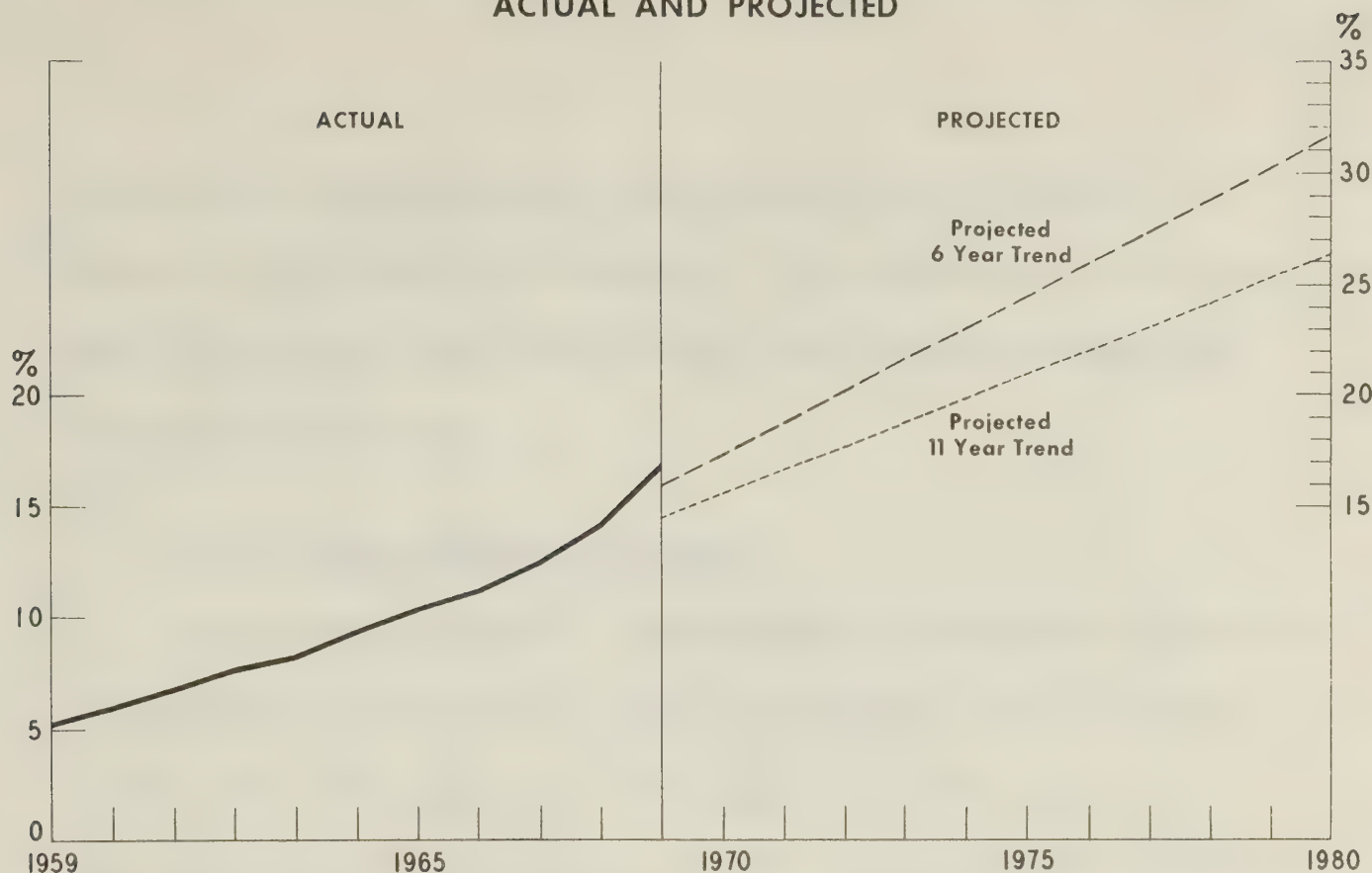
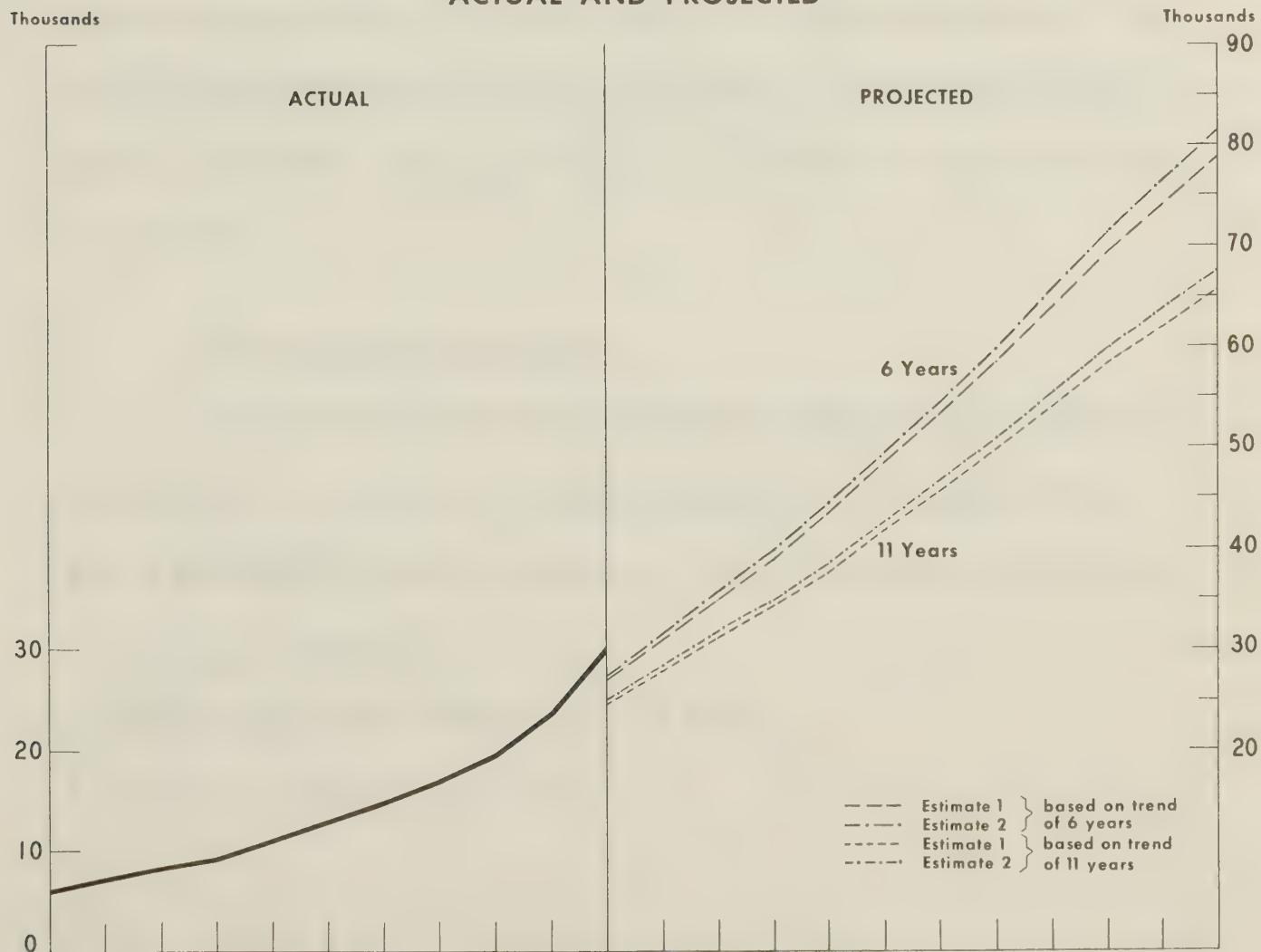


Chart 2

ENROLLMENT IN ALBERTA UNIVERSITIES AND COLLEGES ACTUAL AND PROJECTED



According to the projections, total university enrollment will be between 65,508 and 81,180 students. This represents a more than two-fold increase over 1969-70 figures and a ten-to-thirteen-fold increase over 1959-60.

(ii) Undergraduate Enrollment

According to Chart 3¹, undergraduate enrollment computed as a percentage of the 18-21 age group, is expected to range between 56,789 and 70,404 students. At the upper end of the range this represents a percentage increase of 161 from enrollment in 1969-70.

The figures in Chart 3 differ according to estimates of rates of participation of the 18-21 age group in university education. The rate of participation in 1959-60 was 8.58%. In 1969-70 it was equivalent to 24.95%. It is expected to equal between 39.02% and 47.02% by 1980-81.

(iii) Graduate Enrollment

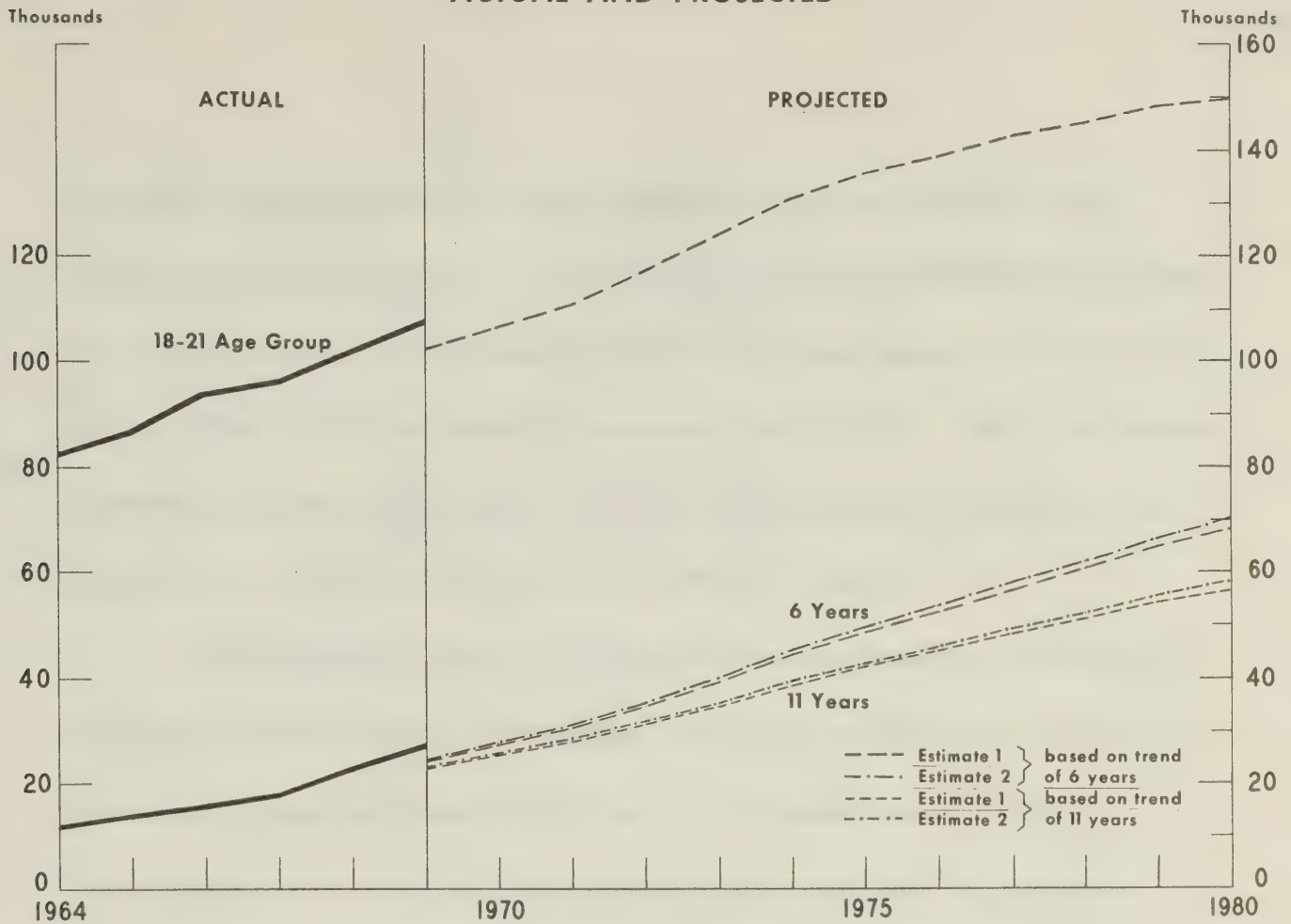
Graduate enrollment projections have been prepared based on recent trends (6 years) in the ratio of graduates to undergraduates and of graduates to total enrollment. Chart 4² indicates the growth

¹ Based on Appendix Tables A-3 and A-4.

² Based on Appendix Table A-5.

Chart 3

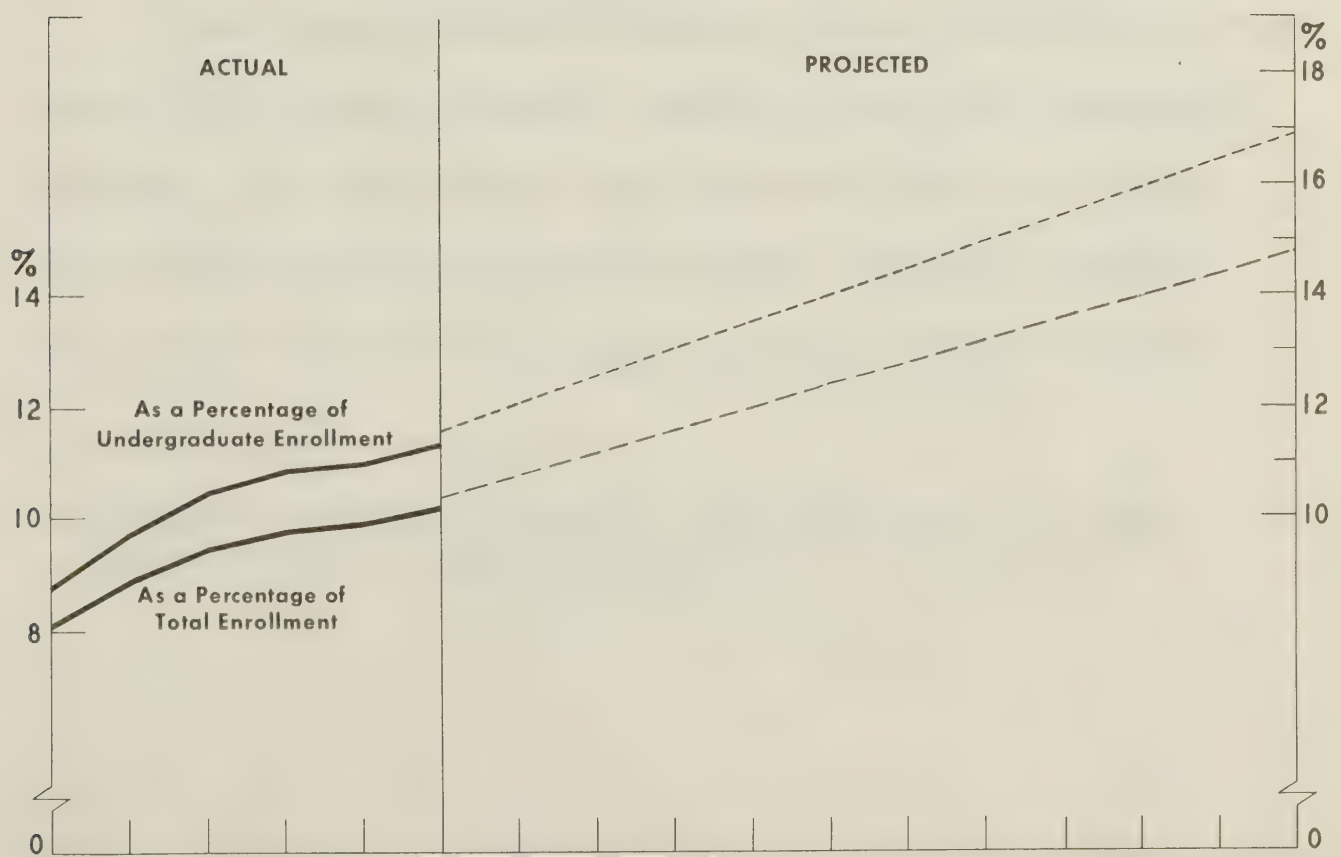
FULL-TIME UNDERGRADUATE ENROLLMENT IN ALBERTA UNIVERSITIES AND COLLEGES ACTUAL AND PROJECTED



30

Chart 4

GRADUATE ENROLLMENT IN ALBERTA UNIVERSITIES AND COLLEGES AS A PERCENTAGE OF TOTAL ENROLLMENT AND UNDERGRADUATE ENROLLMENT ACTUAL AND PROJECTED



in graduate enrollment as a percentage of total enrollment and undergraduate enrollment. In 1959-60 graduate enrollment accounted for 4.73% of total enrollment; in 1969-70 it amounted to about 10.17% and in 1980-81 it is expected to account for 14.75%. As a percentage of undergraduate enrollment, graduate enrollment is projected to jump from 11.32% in 1969-70 to 16.89% in 1980-81.

The projected ratios of Chart 4, when applied to forecasts of total and undergraduate enrollment, yield four estimates of graduate enrollment ranging from 11,558 to 11,974 students in 1980-81. This range represents an almost four-fold increase in graduate enrollment over 1969-70 enrollment.

Concluding Remarks

The recently published Economic Council Staff Study on enrollment in educational institutions¹ provides material for comparative analysis. Since the validity of the projections rests for the most part on the projected rates of participation, Table II-5 compares these rates of the 18-24 age group by province and for Canada and

¹ Zsigmond and Wenaas, op. cit. This study covers the same universities and colleges as are covered in this analysis.

Table II-5

FULL-TIME ENROLLMENT IN UNIVERSITIES AND COLLEGES AS A % OF 18-24 AGE GROUP
ACTUAL AND PROJECTED - SELECTED YEARS
CANADA AND UNITED STATES

	<u>1965-66</u>	<u>1967-68</u>	<u>1969-70</u>	<u>1974-75</u>	<u>1980-81</u>
Newfoundland	6.0	7.5	8.1	11.2	16.2
Prince Edward Island	9.2	11.8	13.5	16.7	20.7
New Brunswick	10.1	11.0	14.1	18.1	22.4
Nova Scotia	11.9	12.1	14.8	19.4	23.3
Quebec	10.2	11.3	10.2	14.6	20.2
Ontario	8.9	10.2	13.2	17.9	22.8
Manitoba	11.4	12.6	14.5	19.4	23.2
Saskatchewan	11.7	12.5	14.1	18.5	22.4
Alberta	10.3	12.1	16.7	22.4	24.8
British Columbia	13.3	14.3	15.4	20.0	23.8
Canada	10.1	11.3	12.7	17.4	22.1
United States		21		24	

Source: Economic Council Staff Study No.25, Appendix A.
United States figures all from Table 3-7, p. 38.

the United States. Such comparisons, though hazardous because of the regional differences characteristic of this country, are nonetheless somewhat indicative of general trends among provinces and between Canada and the United States.

It is interesting to note, first of all, that the Economic Council's statistics show that the province of Alberta lagged somewhat behind British Columbia, Saskatchewan, Manitoba and Nova Scotia in 1965-66 in terms of rate of participation of the 18-24 age group. By 1969-70, however, Alberta had passed these provinces and is projected to have the highest rate of participation to 1980-81. Alberta lies therefore, somewhat above the Canadian average but at least until 1975-76 slightly below the United States average.¹

The Zsigmond-Wenaas projections of the rate of participation of 18-24 age group for the province of Alberta are somewhat lower than those projected here. The lower estimate is accounted for not only by variations in estimation procedures but also by different historical time spans studied. The Council study bases trends on the 1957-58 to 1967-68 period while this study forecasts on the basis of trends established since 1959-60.

¹ The comparison of Canadian and United States figures is subject to the reservations noted by Zsigmond and Wenaas, op. cit., p. 39.

Chapter III

THE REVENUES AND EXPENDITURES OF UNIVERSITIES AND COLLEGES IN ALBERTA

A. Introduction

Chapter 2 reviewed enrollment patterns in institutions of higher education in Alberta and provided projections of enrollment for the next decade. This chapter concerns itself with the financial position of these same institutions and provides an estimate of the cost of the expected expansion in the 1970s. Brief sections are devoted to reviewing methodology and data sources. Operating and capital expenditures will be considered separately and projected on the basis of past patterns. A section is devoted to reviewing operating income and sources of capital funds, with particular attention being paid to the support of the provincial government. Finally some estimates are generated of the probable burden that will have to be borne by major suppliers of funds.

The projections of this chapter, like those of Chapter 2, are not meant to be definitive. Much more intensive disaggregated analysis such as separate expenditure per student ratios for graduate and undergraduates would be necessary if the point of the exercise was to be precise. It is believed that though the estimates

of future requirements are subject to a wide margin of error, particularly in the last half of the 1970s, they are nonetheless an indication of the magnitude of expenditures that can be expected in this decade.

B. Methodology

The method employed here in forecasting educational expenditures requires projections of future enrollment and projections of average expenditure per student. The former projections were prepared in the analysis of Chapter 2 and they will be employed here. Following sections of this chapter deal with expenditure per student estimates. It should be recognized that this procedure suffers from the defect of being based on the assumption that average expenditure per student and the number of students are independent of one another. Definitive projections would require taking account of the relationship between the size and composition of the student body and the expenditure per student¹.

Average expenditure per student is projected on the trend in the rate of growth which has prevailed in the past ten years².

¹ That degree of analysis goes beyond the scope of this study. The method described and employed here is similar to the one employed by the Bladen Commission.

² A special technique described in later sections is used to project capital expenditures.

This procedure assumes that the underlying institutional and economic factors which explain this pattern of growth will not alter materially over the course of the next decade. This assumption may bias projections downward as there would seem to be, if anything, increasing need for universities to expand libraries, provide for more costly graduate education relative to undergraduate education, develop costly research facilities and match the salary demands of highly-trained faculty. These factors may imply higher expenditures per student than those witnessed in the 1960s. ¹

An additional point of methodology must be considered.

The relatively unstable price performance which has characterized the Canadian economy in the latter half of the past decade² must be taken into account when dealing with financial statistics. Expenditure statistics become more meaningful, in a comparative sense, when they are adjusted by a price index to account for changes in

¹ On the other side of the coin, major breakthroughs in the technology of education could result in sharp gains in productivity which might lower the expenditure per student. However, practical implementation of ideas and plans just now being examined require considerable lead time and administrative effort - as well as substantial capital expenditures.

² The gross national expenditure implicit price deflator rose 4.2% from 1968 to 1969.

the purchasing power of money. A "deflated" or "constant" cost series shows the movement of the buying power of money income and permits comparisons to be made of real increases in expenditures over a succession of years¹. Therefore, statistics and projections in subsequent sections will be presented in both current and constant dollar terms.

Two different price indices are employed as deflators in this analysis. The index for operating expenditure, with 1961 as base year, is built up from the implicit price deflator of the education component of gross national expenditure.² The second index for capital expenditures also has 1961 as base year and is based on the government non-residential construction component of gross national expenditure. These indices are, unfortunately, on a calendar year basis while the financial information is based on a university and college fiscal year ending March 31st. Since quarterly data are not available for the above indices it was assumed that the price movement on a calendar year basis applied equally in the relevant fiscal year.

¹ On this point see: Daniel B. Suits, Statistics: An Introduction to Quantitative Economic Research, (Chicago: Rand McNally and Co. , 1963), p. 239.

² Unpublished material obtained from the National Accounts Division of the Dominion Bureau of Statistics. (January, 1970).

C. Data

Financial statistics for the years 1964-65 to 1967-68 were obtained from the Dominion Bureau of Statistics publication Canadian Universities, Income and Expenditure¹. The institutions covered in this publication are the same ones considered in Chapter 2. For the years prior to 1964-65 financial information was published by region and not by province. Financial estimates for 1959-60 to 1963-64 were gathered from the annual reports of the universities, the public accounts of the province and the annual reports of the Universities Commission. With the exception of Canadian Union College for which reports are not available, financial data including the first years of the decade cover the same institutions as those reported in Chapter 2.

D. Expenditures

(i) Review of the 1960s

(a) Operating Expenditures

Operating expenditures generally include salaries, libraries, assisted research, administration, plant maintenance, scholarships, and some miscellaneous items. Table III-1 presents statistics on

¹ 1968-69 data are an unpublished estimate of the Bureau.

Table III-1

OPERATING EXPENDITURES OF ALBERTA
UNIVERSITIES AND COLLEGES, 1959-60 TO 1968-69

Current \$

<u>Academic Year</u>	<u>Operating Expenditure</u> (\$ Thousands)	<u>Operating Expenditure Per Student</u> (\$)	<u>% Change In Operating Expenditure Per Student</u>
1959-60	8,617	1,386	-
1960-61	11,107	1,528	10.2
1961-62	14,208	1,672	9.4
1962-63	17,126	1,741	4.1
1963-64	20,495	1,850	6.3
1964-65	27,473	2,117	14.4
1965-66	34,997	2,373	12.1
1966-67	47,476	2,796	17.8
1967-68	61,868	3,142	12.4
1968-69	80,700 ^e	3,238	3.1

Constant \$

1959-60	9,206	1,481	-
1960-61	11,606	1,597	7.8
1961-62	14,208	1,672	4.7
1962-63	16,627	1,690	1.1
1963-64	19,353	1,747	3.4
1964-65	25,228	1,944	11.3
1965-66	30,538	2,071	6.5
1966-67	38,819	2,286	10.4
1967-68	47,264	2,401	5.0
1968-69	58,819 ^e	2,360	- 1.7

^e D. B. S. estimate.

Source: See text, p. 38.

operating expenditures since 1959. In current dollar terms such expenditures increased ten-fold. The average cost per student rose on an erratic growth path over the ten-year period from a level of \$1,386 in 1959-60 to \$3,238 in 1968-69. This rise represents an average annual increase of 13.4%.

In real or constant dollar terms, operating expenditures rose from over \$9 million in 1959-60 to almost \$59 million in 1968-69. Over the period average annual cost per student rose about 6%. The 1968-69 average constant dollar cost per student is \$2,360.

Though a detailed resumé of the factors involved in the expenditure rise is not attempted here, it seems safe to say that a large part of the increase can be traced to the following factors:¹

- (1) Rapidly increasing enrollment which necessitated larger training staffs.
- (2) Higher salaries awarded to faculty as a result of the increasing demand for their services.
- (3) Expansion of graduate faculties, research facilities and adult education.
- (4) Greater maintenance expenditures required by expanded physical facilities.
- (5) Rising costs of labour, materials, and supplies.

¹ For support of these arguments see: Edward F. Sheffield and Dave M. Apsimon, University Costs and Sources of Support, Canadian Universities Foundation, (Ottawa, 1962), p. 9; and Canada, Dominion Bureau of Statistics, Canadian Universities, Income and Expenditure, 1964-65, and ensuing years.

(b) Capital Expenditures

Capital expenditures include expenditures on land and buildings and their contents. During the ten years ended 1968-69, university and college capital expenditures on buildings, equipment and service facilities totalled over \$243 million in current dollar terms, rising from \$12 million in 1959-60 to a high of about \$58 million in 1967-68. Table III-2 provides the relevant information in terms of expenditures per additional student.¹ Though the trend has been erratic it has been nonetheless markedly upwards over the decade. In constant dollar terms capital expenditure per additional student fluctuated from a low of \$5,341 in 1961-62 to a high of \$17,166 in 1967-68.

The increase in capital cost expenditures results for the most part from the same conditions listed earlier. They reflect, in addition, the rapid expansion of student residences,² land acquisition and of course, newer buildings and more elaborate facilities.

¹ The assumption here is that the trend in capital expenditures is best related to the annual increase in the number of students enrolled.

² On this point see Bladen Report, op. cit., p. 22.

Table III-2

CAPITAL EXPENDITURES OF ALBERTA UNIVERSITIES
AND COLLEGES, 1959-60 TO 1968-69

Current Dollars

<u>Academic Year</u>	<u>Total Capital Expenditure</u> (\$Thousands)	<u>Number of Additional Student</u>	<u>Expenditure Per Additional Student</u>
1959-60	12, 034	782	15, 389
1960-61	13, 009	1, 053	12, 354
1961-62	6, 575	1, 231	5, 341
1962-63	12, 765	1, 338	9, 540
1963-64	14, 284	1, 242	11, 501
1964-65	19, 175	1, 898	10, 103
1965-66	24, 170	1, 772	13, 640
1966-67	41, 308	2, 234	18, 491
1967-68	57, 533	2, 705	21, 269
1968-69	42, 521 ^e	5, 234	8, 124

Constant Dollars

1959-60	11, 650	782	14, 898
1960-61	12, 473	1, 053	11, 845
1961-62	6, 575	1, 231	5, 341
1962-63	12, 515	1, 338	9, 354
1963-64	13, 437	1, 242	10, 819
1964-65	17, 543	1, 898	9, 243
1965-66	20, 588	1, 772	11, 619
1966-67	33, 073	2, 234	14, 804
1967-68	46, 435	2, 705	17, 166
1968-69	33, 168 ^e	5, 234	6, 337

^e D. B. S. estimate.

Source: Ibid.

Table III-3

OPERATING, CAPITAL AND TOTAL EXPENDITURES OF
UNIVERSITIES AND COLLEGES IN ALBERTA
1959-60 TO 1968-69

(\$ Thousands)

<u>Academic Year</u>	<u>Operating Expenditure</u>	<u>Capital Expenditure</u>	<u>Total Expenditure</u>
1959-60	8,617	12,034	20,651
1960-61	11,107	13,009	24,116
1961-62	14,208	6,575	20,783
1962-63	17,126	12,765	29,891
1963-64	20,495	14,284	34,779
1964-65	27,473	19,175	46,648
1965-66	34,998	24,170	59,167
1966-67	47,476	41,308	88,784
1967-68	61,868	57,533	119,401
1968-69	80,700 ^e	42,521 ^e	123,145 ^e

Constant Dollars

1959-60	9,206	11,650	20,856
1960-61	11,606	12,473	24,079
1961-62	14,208	6,575	20,783
1962-63	16,627	12,515	29,142
1963-64	19,353	13,437	32,790
1964-65	25,228	17,543	42,771
1965-66	30,538	20,588	51,126
1966-67	38,819	33,073	71,892
1967-68	41,264	46,435	93,699
1968-69	58,819 ^e	33,168 ^e	91,987 ^e

^e D. B. S. estimate.

Source: Table III-1 and III-2

(c) Total Operating and Capital Expenditures

Table III-3 reviews total expenditure over the ten-year period. In current dollar terms total expenditure rose from \$20.7 million to \$123.1 million, an average annual increase of 23.5%. In constant dollar terms the average annual increase amounts to 19.3%. Enrollment over this period was increasing at an average annual rate of 17.0%.

(ii) Projections for the 1970s

(a) Operating Expenditures

Table III-4 provides projections of operating expenditure per student and total operating expenditures based on the assumption that the trends established in the last decade will prevail through the current one. In current dollar terms, operating expenditure per student is expected to rise to \$5,759 by 1980-81. This represents an average annual increase of 5.9% in the expenditure per student over the decade. Assuming enrollment of almost 80,000 by that time, operating expenditures are forecast to total over \$460 million in 1980-81.¹ This would represent an average annual increase in operating expenditures of about 15%.

¹ Enrollment projections based on the trend of the last six years were chosen for the analysis in Table III-4.

Table III-4

OPERATING EXPENDITURE PER STUDENT AND
TOTAL OPERATING EXPENDITURES

Projections Based on 10-Year Trend
Current and Constant Dollar
1969-70 to 1980-81

	Operating Expenditure Per Student		Projected <u>Enrollment</u> ¹	Total Operating Expenditures (Millions of Dollars)	
	<u>Current \$</u>	<u>Constant \$</u>		<u>Current \$</u>	<u>Constant \$</u>
1969-70	3,376	2,523	30,000	101,280	75,690
1970-71	3,592	2,632	31,165 ²	111,945	82,026
1971-72	3,809	2,741	35,203	134,088	96,491
1972-73	4,026	2,850	39,270	158,101	111,920
1973-74	4,243	2,958	43,625	185,101	129,043
1974-75	4,459	3,067	48,667	217,006	149,261
1975-76	4,676	3,176	53,660	250,914	170,424
1976-77	4,893	3,285	59,163	289,485	194,350
1977-78	5,109	3,393	64,702	330,563	219,534
1978-79	5,326	3,502	70,183	373,795	245,781
1979-80	5,543	3,611	75,074	416,135	271,092
1980-81	5,759	3,720	79,937	460,357	297,366

¹ Average of projections provided in Table A-2.

² Refer to footnote 1, p. 27, Chapter 2.

In constant dollar terms, operating expenditure per student is forecast to rise 3.9% on an annual basis from \$2,253 in 1969-70 to \$3,720 in 1980-81. This implies operating expenditures of \$297 million in 1980-81 up 74% from the \$76 million of 1969-70. The average annual increase in expenditures would then be about 13%.

(b) Capital Expenditures

The capital expenditures projections provided in Table III-5 are based on the average expenditure per additional student in the last decade applied to the projected number of additional students expected in each year of the current decade.¹ The average expenditure over the last decade is established at \$11,867 in current dollars and \$10,464 in constant dollars. This expenditure is increased yearly by 5% in current dollar terms and by $2\frac{1}{2}\%$ in constant dollar terms to take account of rising costs and quality improvements.²

¹ This procedure is similar to that used in the Bladen Report, op. cit., p. 28. For a discussion of an alternative procedure based on total student enrollment see Sheffield and Apsimon, op. cit. Technical note #5, p. 33.

² The implicit price deflator on government non-residential construction actually rose at an average rate of 4% since 1961. It is assumed the deflator will rise at a rate of 2.5% over the current decade.

Table III-5

PROJECTED CAPITAL EXPENDITURES OF
ALBERTA UNIVERSITIES AND COLLEGES

	Projected Number of Additional Students ¹	Expenditure Per Additional Student		Total Capital Expenditures (Millions of Dollars)	
		Current \$	Constant \$	Current \$	Constant \$
1969-70	5,078	12,460	10,726	63,272	54,467
1970-71	4,385 ²	13,083	10,994	57,369	48,208
1971-72	4,038	13,737	11,269	55,470	45,504
1972-73	4,067	14,424	11,551	58,662	46,978
1973-74	4,355	15,145	11,840	65,956	51,563
1974-75	5,042	15,902	12,136	80,178	61,190
1975-76	4,993	16,697	12,439	83,368	62,108
1976-77	5,503	17,532	12,750	96,479	70,163
1977-78	5,539	18,409	13,069	101,967	72,389
1978-79	5,481	19,329	13,396	105,942	73,423
1979-80	4,891	20,295	13,731	99,263	67,158
1980-81	4,863	21,310	14,074	103,631	68,442

¹ See footnote 1, Table III-4

² This number has been arbitrarily adjusted upward in order to provide a realistic estimate for 1970-71. For further comment see Chapter 2, p. 27, footnote 1.

On the basis of this analysis, capital expenditures in current dollars are expected to total \$318 million from 1970-71 to 1974-75 and \$487 million from 1975-76 to 1979-80. This compares with the five-year totals of \$59 million for 1959-60 to 1963-64 and \$185 million for 1964-65 to 1968-69.

E. Revenues

(1) Review of the 1960s

(a) Operating Income

Operating income includes tuition fees, federal and provincial government grants as well as gifts, alumni, corporate and religious contributions and miscellaneous items. Also included in the calculations of Table III-6 are funds received for assisted research on the grounds that such income helps pay for research professors' salaries, a share of the cost of facilities and a share of the general overhead of the university and college.¹

Figures recorded in Table III-6 are recorded from the university and/or college's point of view. As a result they fail to clearly reflect the federal government's share of total operating income. Beginning in 1967-68, the federal government stopped its direct payments to the universities and colleges and reimbursed the Province for 50% of the cost of approved expenditures for post-

¹ For further discussion of this point, see: Bladen Report, op. cit., p. 50.

Table III-6

OPERATING INCOME OF ALBERTA UNIVERSITIES AND COLLEGES
INCLUDING SPONSORED RESEARCH
BY SOURCES 1959-60 TO 1968-69

(thousands of dollars)

<u>Academic Year</u>	<u>Tuition Fees</u>	<u>Federal Government</u>	<u>Provincial Government</u>	<u>Other</u>	<u>Total</u>
1959-60	1,772	1,818	4,784	132	8,506
1960-61	2,049	1,876	7,153	143	11,221
1961-62	2,796	1,947	9,445	128	14,316
1962-63	3,082	2,666	11,479	145	17,372
1963-64	4,016	2,716	13,574	121	20,427
1964-65	5,824	4,734	15,805	1,751	28,114
1965-66	6,644	5,494	19,509	2,185	33,832
1966-67	7,912	10,441	27,444	2,464	48,261
1967-68	8,760	5,433	44,345	3,140	61,678
1968-69	13,500 ^e	7,100 ^e	58,350 ^e	6,700 ^e	85,650 ^e

Percentages

1959-60	20.8	21.4	56.2	1.6	100.0
1960-61	18.3	16.7	63.7	1.3	100.0
1961-62	19.5	13.6	66.0	0.9	100.0
1962-63	17.7	15.3	66.1	0.8	100.0
1963-64	19.7	13.3	66.5	0.6	100.0
1964-65	20.7	16.8	56.2	6.2	100.0
1965-66	19.6	16.2	57.7	6.5	100.0
1966-67	16.4	21.6	56.9	5.1	100.0
1967-68	14.2	8.8	71.9	5.1	100.0
1968-69	15.8	8.3	68.1	7.8	100.0

^e D.B.S. estimate.

Source: See text, p. 38.

secondary education. In fact, then, provincial government contributions also reflect a substantial sum of money transferred from the federal to the provincial government for the explicit benefit of post-secondary institutions. This transfer amounted to \$16 million in 1967-68 and about \$35 million in 1968-69.¹ For purposes of clarity and continuity, the federal government's share has been shown separately in Table III-6. A following section which provides projections of funds required by source will treat federal and provincial government grants simply as government sector contributions.

Table III-6 indicates that operating income has risen ten-fold from the 1959-60 level of \$8.5 million to the 1968-69 level of \$85.7 million. Over the period reviewed, the share of total operating income provided by tuition fees has fallen from about 20% to 16%. Federal government contributions advanced directly to the education institutions varied between 15 - 22% from 1959-60 to 1966-67. Contributions from the last two years reflect only funds provided for assisted research, vocational education and social welfare. The share of the provincial government has fluctuated around 55 - 65% over the decade, jumping upward in 1967-68 and 1968-69 as a

¹ Alberta, Public Accounts, Fiscal Years Ended March 31, 1968 and 1969.

result of the treatment of federal monies listed above. The share of the other components, which includes corporate, alumni and religious contributions and endowment income, has shown a definite tendency to rise in the latter part of the decade.

(b) Capital Income

Over the five-year period from 1959-60 to 1963-64, total capital income amounted to \$58.7 million. The corresponding amount for the following five-year period was \$186.8 million, an increase of 128% over the earlier period. As Table III-7 clearly shows, the provincial government has tended to carry the very largest share of capital income. The other component which represents loans, reserves, funds from current revenues and other services has fluctuated widely and in recent years has contributed less than 20% of the total.¹

(ii) Projections for the 1970s

The projections provided in this section reflect the funds that will be needed and not necessarily the funds that will be provided. In fact, the Province of Alberta has already undertaken to limit at

¹ The Province's matching gift offer, under which it undertook to match gifts to the universities for approved projects might be expected to have some impact through the 1970s. See Alberta, Universities Commission, Annual Report 1968-69 p. 11.

Table III-7

CAPITAL FUNDS OF ALBERTA UNIVERSITIES AND
COLLEGES BY SOURCE
1959-60 TO 1968-69

(Thousands of Dollars)

<u>Academic Year</u>	<u>Federal Government</u>	<u>Provincial Government</u>	<u>Other</u>	<u>Total</u>
1959-60	n.a.	11,726	308	12,034
1960-61	n.a.	10,841	2,168	13,009
1961-62	n.a.	5,744	831	6,575
1962-63	n.a.	9,618	3,147	12,765
1963-64	n.a.	9,265	5,019	14,284
1964-65	1,275	12,409	5,537	19,221
1965-66	459	20,091	3,435	23,985
1966-67	-	37,922	3,390	41,312
1967-68	2,272	46,121	9,545	57,938
1968-69 ^e	-	39,500	4,800	44,300

Percentages

1959-60	n.a.	97.4	2.6	100.0
1960-61	n.a.	83.3	16.7	100.0
1961-62	n.a.	87.3	12.6	100.0
1962-63	n.a.	75.3	24.7	100.0
1963-64	n.a.	64.9	35.2	100.0
1964-65	6.6	64.6	28.8	100.0
1965-66	1.9	83.8	14.3	100.0
1966-67	-	91.8	8.2	100.0
1967-68	3.9	79.6	16.5	100.0
1968-69	-	89.2	10.8	100.0

^e D.B.S. estimate

Source: Ibid.

least capital grants to universities. Early in 1967 the provincial government announced that it would make available to the universities over a five-year period, \$175 million for capital purposes.¹ The federal government has also initiated discussions with the provincial governments to discuss possible limits to the shared-cost post-secondary education program.² To the extent that the government sector chooses to restrict or redirect its spending, then the universities and colleges will be faced with the choice of finding new sources of money, restricting enrollment, or possibly lowering the quality or standards of education. The projections provided here assume that the funds necessary to meet the anticipated expansion will be provided and in the proportions that prevailed in the latter part of the 1960s.

The estimates of Table III-8 are based on the projections of enrollment and operating expenditure per student developed in

¹ Alberta, Universities Commission, Annual Report 1967-68, section A5 (f). The total sum has been increased to \$185 and modified to provide money under the matching grants proposal outlined on p. 51.

² For a report on these discussions see: Canada, Federal-Provincial Continuing Committee on Fiscal and Economic Matters, Report of the Sub-Committee on Joint Programs, November, 1969, Section II-D.

Table III-8

PROJECTED SOURCE OF FUNDS FOR OPERATING EXPENDITURES
1969-70 TO 1980-81
Current Dollars

(millions of dollars)

	<u>Total Projected Operating Expenditures¹</u>	<u>Tuition Fees</u>	<u>Government Sector</u>	<u>Other</u>
1969-70	101,280	15,192	77,986	8,102
1970-71	111,945	16,792	86,198	8,956
1971-72	134,088	20,113	103,248	10,727
1972-73	158,101	23,715	121,738	12,648
1973-74	185,101	27,765	142,528	14,808
1974-75	217,006	32,551	167,094	17,360
1975-76	250,914	37,637	193,204	20,073
1976-77	289,485	43,423	222,904	23,159
1977-78	330,563	49,584	254,533	26,445
1978-79	373,795	56,069	287,823	29,904
1979-80	416,135	62,420	320,425	33,291
1980-81	460,357	69,054	354,475	36,829

Source: See Table III-4.

¹ It is assumed the three main sources provide the following percentages of total revenue through the forecast period
tuition: fees - 15%; government sector - 77%; and other - 8%.

earlier sections.¹ Tuition fees are expected to cover 15% of total operating funds, the government sector 77%, and the remainder from other sources of funds. By 1974-75 total operating expenditures of \$217 million are expected to be financed by tuition fees of \$33.5 million, government grants of \$167 million, and \$17 million from other sources. Corresponding figures for 1968-69 were \$13.5 million, \$65.5 million and \$7 million for total operating expenditures of about \$86 million. In percentage terms, by 1974-75 operating expenditures will have risen 152%.

As far as sources of funds for capital expenditures are concerned, it has already been noted that the provincial government is by far the largest supplier of funds for capital projects. Since the government has chosen to provide capital funds on the basis of a 5-year plan it would seem more appropriate to provide estimates on the same basis. Projections used in the table below are drawn up on the basis of the analysis in Table III-5.

¹ The percentages used in Table III-8 are based on operating income and they are being applied to projections of operating expenditures. The implicit assumption is that operating income = operating expenditure though in fact the universities and colleges generally register surpluses on operating account. However, since the sums tend to be small in percentage terms and at least part of the surplus is transferred to the capital account, it would seem to be safe to project with the operating expenditure base.

Table III-9

ACTUAL AND PROJECTED CAPITAL EXPENDITURES
OF UNIVERSITIES AND COLLEGES

5-Year Period

(millions of current dollars)

	1967-68 to <u>1971-72</u> ¹	1972-73 to <u>1976-77</u>	1977-78 to <u>1980-81</u> ²
Calculated Requirement	276	385	411
Anticipated Government Support	235	327	349
Government Support as a % of Total Requirement	85%	85%	85%

¹ actual and estimate

² four year period

On the basis of actual figures to date, budget speech estimates and trends of the late 1960s, it would seem that the provincial government will provide about 85% of the funds needed for university and college expansion. Assuming this percentage remains the same, it can be seen that of total capital requirements of \$385 million in the middle period of the 1970s, some \$327 million would be required to come from the provincial government.

Chapter IV

PRICING HIGHER EDUCATION

A. Introduction

The analysis of Chapters Two and Three draws forth the following two general observations:

1. Through the 1960s, Alberta universities and junior colleges underwent tremendous expansion as a result of not only large numbers of eligible people in the 18-24 age group but also as a result of rapidly rising rates of participation. One of the consequences of this rapidly expanding enrollment was greater and greater participation by the government sector in the financing of higher education institutions.
2. On the basis of population forecasts for the province of Alberta and assuming no decrease in rising rates of participation of the relevant university-age group, enrollment pressures on universities and colleges are likely to be as severe in the 1970s as they were in the 1960s.¹ Assuming even no change in the present public-private

¹ It should be noted that the projections of Chapters' Two and Three are based solely on full-time student enrollment. Pressures on facilities and expenditures are magnified when one considers the likely expansion of part-time student study and adult education. Expenditure projections in this thesis should therefore be regarded as being on the low side of the anticipated financial burden. For a review of the part-time area see Zsigmond and Wenaas, op. cit., Chapter 5.

split of the total financial cost, the public share will continue to rise in large absolute amounts throughout the 1970s.

This tremendous expansion and anticipated continuing pressure on the government sector¹ for more funds for higher education comes at a time when the government sector as a whole has been undergoing rapid expansion.² Between 1961 and 1968, government sector expenditures almost doubled reaching about \$24 billion.³ At the end of the Korean War such expenditures represented just over one-quarter of the gross national product while today they amount to about one-third. By 1975, without allowance for any major new programs, government expenditure will almost double again to \$43 billion.⁴ The Council's

¹ The analysis of this chapter will be general in that government sector contributions will be spoken of without attempting to draw any distinctions between the federal and provincial levels of government.

² For a succinct review of this expansion see Economic Council of Canada, Sixth Annual Review (Ottawa: Queen's Printer, 1969), Chapter 3.

³ Ibid., p. 25.

⁴ Ibid. The Council also notes that revenues of the government sector are expected to advance strongly to 1975 as the economy moves to potential output. According to the reports of the Tax Structure Committee, however, the strong revenue performance will be much more in evidence at the federal rather than at the provincial level. In view of the fact that provincial governments tend to carry a somewhat heavier burden in financing higher education, this revenue forecast has further serious implications for spending on higher education.

projections involve some increase in the relative size of the government sector in the economy.

The implication of the Council's estimates for the government sector as a whole, and the analysis of the preceding chapters for higher education in particular, is that difficult choices will have to be made among alternative uses of funds in the current decade. The economy's capacity to provide the resources to satisfy expanding needs either private or public - is not unlimited.¹ In other words, automatic spending increases and ad hoc reactions to public needs will not likely be the order of the day in the 1970s. Therefore, it becomes somewhat imperative that present government programs be analysed within a framework which permits evaluation of the usefulness of such expenditure in light of the overall objectives of government spending.

This chapter will examine expenditures on higher education in terms of three basic economic objectives underlying government revenue and expenditure programs: stability, income redistribution

¹ Ibid., p. 26.

and growth.¹ Each of these objectives will be reviewed briefly and short summaries of some of the available empirical work will be undertaken. This approach concentrates on the usefulness of government sector expenditures on higher education and does not attempt a detailed cataloguing of private and social benefits of higher education.² Rather, it is an attempt to consider the resource allocation aspects of government sector expenditures on higher education and the attendant implications for public and private shares in the financing of higher education.

¹ For a discussion of public policy objectives see: Albert J. Robinson, "Tax Policy for Growth-Reconciliation with Other Objectives", Canadian Tax Journal, XII, No. 4 (July-August, 1964), pp. 253-263; Albert J. Robinson, "Government Expenditures on Education", Canadian Tax Journal, XIII, No. 5 (September-October, 1965), pp. 390-397; E. S. Kuschen et al., Economic Policy of Our Time (Amsterdam: Rand McNally Co., 1964) I, esp. Chapter I and Roland N. McKean, Public Spending, (New York: McGraw-Hill, 1968), Part Two. The objective of reducing regional income disparity is not considered here. For treatment of this objective see: B. W. Wilkinson, The Sixth Annual Review: A Commentary (Montreal: Private Planning Association of Canada, November, 1969), pp. 20-23.

² The question of such benefits will be touched on in the section on growth. The attempt here is to review a major aspect of the economics of education, i. e. the public finance portion of the study area. For a discussion of the relationship between the economics of education, educational finance and public finance, see J. Miner, "Financial Support of Education", Designing Education for the Future, #2, ed. E. C. Morphet and Charles D. Ryan (New York: Citation Press, 1964).

B. Economic Policy Objectives and Government Expenditures on Higher Education

The analysis here will concentrate only on the economic objectives for public educational outlays though in fact there are social, political and other non-economic objectives for such outlays. Clearly, the use of economic criteria are not the sole standard by which allocation decisions are taken. Therefore, the analysis that follows deals with a crucial but only partial dimension of social welfare - the economic.

1. Stabilization

The stability objective generally refers to the variance of government outlays and revenues over the business cycle in an effort to contribute to overall price stability and to the maintenance of full-employment. If higher education expenditures were to be employed in a stabilizing manner, one can hypothesize the following situation:

"In periods of unemployment, governments might increase subsidies to enable students to continue their education and defer their entry into the labour force.

Under inflationary conditions, a consistent policy might imply a reduction in educational expenditures in order to encourage premature entry into the labour market. "¹

Numerous difficulties would be encountered if educational expenditure were to be employed in a stabilizing manner. First of all, as Robinson points out:

"... to gear expenditures on formal education to movements in some index of prices or economic activity, would wreak havoc in an educational system 'producing' knowledge and skill at a rate determined by human absorptive capacity. "²

Moreover, given the nature of higher education, that is to say, the three-four year education programmes, the stock of capital and the planning lags, it is difficult to imagine higher education expenditures being "turned on and off like a tap". ³

Adopting a slightly different tact, Miner believes that the notion of varying educational outlays in order to contribute to overall economic stability is rejected mainly because

¹ This example where stabilization measures are aimed at the labour market comes from Robinson, "Government Expenditures on Education", XIII, op. cit., p. 391. This case is only one of many ways in which increasing or decreasing educational expenditures might be stabilizing.

² Ibid., p. 391.

³ Ibid. It would be, it seems, possible to devise a five year capital expenditure programme for universities which might be accelerated or even delayed in response to cyclical activity.

"... it is thought that stabilization goals should be achieved without a prejudgement about which goods or services should be affected. "¹

Speaking of the United States, Miner goes on to say

"Contemporary analysis places the primary responsibility for stabilization policy on the tax and transfer mechanism of the federal government which has the duty to provide a full employment level of income out of which state, local and even the federal government can meet the educational and other requirements of their citizens. "²

Stabilization objectives are seemingly better regarded as an area of policy which should not influence the financing of higher education. ³

2. Income Redistribution

The focus of this section is on the income redistributive effects of public expenditure outlays on higher education institutions. The intent is to determine whether, on balance, such expenditures are regressive, progressive or neutral in terms of their impact on income distribution.

Schultz has argued that in terms of all education levels,

¹ J. Miner, op. cit., p. 303.

² Ibid.

³ For support of this conclusion see both Robinson and Miner. Miner further argues that education finance programs be insulated from year to year fluctuations.

"The rise in the investment in education relative to that invested in non-human capital increases total earnings relative to total property income, and property income is distributed much less equally than the earnings of persons from labour. Therefore, investment in schooling reduces the inequality in the distribution of personal income." ¹

In so far as higher education is concerned, Schultz is of the opinion that it is certainly not neutral in its personal income distribution effects. Whether it is progressive or regressive depends on the distribution of the personal costs and personal benefits of higher education.

A cursory review of some of the costs of higher education and a casual assessment of who benefits would lead one to believe that the income-redistributive effects of government financial aid to universities and colleges is regressive. ² In the first place,

¹ Schultz, op. cit., p. 339.

² Richard Judy comments in "The Income-Redistribution Effects of Aid to Higher Education", Canadian Economic Problems and Policies, eds., Lawrence H. Officer and Lawrence B. Smith (Toronto: McGraw-Hill, 1970), pp. 302-317.

attendance at such institutions would seem to be restricted to a large extent to individuals from families in middle and upper income brackets. Secondly, admission is restricted to a minority of individuals with above average intelligence and maturation.

Gary Becker has pointed out the fact that higher income families, having a capacity to purchase superior education and to provide an environment conducive to academic achievement offers children from such families a considerable advantage over those from poorer families, even when there may be no differences in innate ability.¹

In fact, available evidence indicates that the children of relatively wealthy families are much more than proportionally represented among university and college students.² In 1964-65, for example, over 26% of university and college students' families had yearly money incomes of over \$10,000. Only a little more than 9% of enrolled students came from families with incomes of less than \$3,000 even though 24% of all Canadian non-farm family units are at this income level.

¹ Noted in Robinson, "Government Expenditures . . .", op. cit., p. 392.

² See Judy, op. cit., Table 1, p. 305. The correlation between high incomes and education is a strong one. See also J. R. Podoluk, Income of Canadians, (Ottawa: Dominion Bureau of Statistics, 1968), Chapter 4.

Superior home environments are of course not the only reason that children from relatively well to do families are over-represented in universities and colleges - the very real financial expenses of attending university is a large stumbling block for many individuals. The direct costs of attending university, that is, tuition fees, books and living expenses are important constraints on attendance for almost every individual coming from poor families. Even more important, however, are "the opportunity costs that students must forego in order to attend university".¹ Becker has estimated that foregone earnings accounted for 74% of a college student's total costs while Schultz's estimates indicate that foregone earnings accounted for 59% of the private cost of schooling at the university level.²

Richard Judy in his recent study³ has attempted to assess some of the costs and incidence of benefits noted above in order to determine whether or not increasing the subsidy to university education would represent an increased net transfer from poor to rich and hence be regressive in terms of the impact on income distribution. Judy catalogued the incidence of university and

¹ Robinson, "Government Expenditures. . . ", p. 392.

² Quoted in Robinson, Ibid.

³ Judy, op. cit.

college costs by five family income classes and noted that

"... about one-tenth of government grants to university capital and operating revenues was contributed by families with under \$3,000 annual money income. About one-fifth was contributed each by the \$3,000 - \$4,999 and the \$7,000 - \$9,999 classes. The \$5,000 - \$6,999 and \$10,000 and above classes contributed about one-quarter each." ¹

In terms of the incidence of benefits, ² Judy found, having assumed that future income represents the benefits of education, that in so far as university graduates are concerned the public subsidy of their study does represent a regressive kind of income redistribution. ³ Taking account of both graduates as well as university drop-outs modifies this conclusion somewhat. Judy's final conclusion is that though the slight over-all redistributive effect is in the progressive direction, approximations of data and analysis do not accord this result much significance. At this point it would seem wise to accept Robinson's conclusion that at best higher education expenditures are neutral in terms of their income redistributive effects. ⁴

¹ Ibid., p. 308. Emphasis added.

² Only direct benefits such as enhanced earning power and the consumption benefits of education and indirect benefits represented by the public portion of the full cost of education were taken into account. External benefits were not treated in his analysis.

³ For example, see Judy, op. cit., Table 4, p. 312.

⁴ Robinson, "Government Expenditures . . . , " op. cit., p. 20.

3. Economic Growth

It would seem fair to say that the primary economic justification for higher education expenditures by governments is to be found in the third policy objective, namely economic growth. The Economic Council of Canada, which can properly be viewed as an institution offering guidance to public policy-makers, has for sometime regarded investment in "human capital" as an important source of economic growth. For example, in its Second Annual Review the Economic Council noted:

"... education is one of the most important of these factors [contributing to long-term growth of real income and productivity]" ¹

And for the future, the Council further noted:

"Very considerable scope would appear to exist in Canada to promote the growth of average per capita income by improving the educational stock of the labour force. The accumulating evidence and analysis suggest that the benefits from such improvements can be substantial for both the individuals and the economy as a whole." ²

More recently, the Chairman of the Council remarked that one of the main driving forces behind the remarkable expansion in postsecondary education in the 1960s was the view that education is

¹ Economic Council of Canada, Second Annual Review, (Ottawa: Queen's Printer, 1965), p. 91.

² Ibid., p. 93.

an investment which produces good longer-term yields, not merely for the recipients but for the community as a whole.¹ The Economic Council's most recent annual review is noteworthy in that it appears to call for continuing rapid rates of increase on university and college expenditures in the 1970s, having assumed that it has proven the case for such expenditures in previous studies. In this connection, Bruce Wilkinson comments:

"The Council's position appears to be that it has in the earlier Review 'proved' the economic importance of spending on education . . . and that the enormous increases we have witnessed in outlays in recent years and the almost overwhelming increases the Council projects to 1975 are clearly warranted. More specifically the Council suggests that the returns to investment in education are greater than the returns to other forms of investment." ²

The Bladen Report, for its part, cited the Gordon Report, the Robbins Report and some reports of the Economic Council in support of the proposition that the growth in gross national product is, in part, dependent on the level of investment in higher education.³ In its recommendations, the Bladen report noted the

¹ Arthur J. Smith, "An address to McMaster University President's Seminar on the Role of the University in Modern Society - Its Functions and Purpose," October 18, 1969, p. 13.

² Bruce W. Wilkinson, The Sixth Annual Review: A Commentary. (Montreal: Private Planning Association of Canada, Nov. 1969), p. 20.

³ The Bladen Report, op. cit., Chapter 1.

benefits to the individual and recommended that students be charged tuition fees. However, in calling for governments to prepare themselves for expansion of higher education on the scale of the Sheffield projections and simultaneously recommending that fees remain at about the present level, the Commission it would seem implicitly assumed the "soundness" of the case for ever increasing public contributions to the financing of higher education.¹

To the extent that the comments of the Economic Council of Canada and to a certain extent those of the Bladen Commission, represent a guiding voice to decision-makers at the federal and provincial level, it would seem safe to conclude that the growth objective is the primary economic justification for higher education expenditures. The seemingly ad hoc response of government spending programmes to higher education needs² would seem to lend some support to this conclusion.

¹ Ibid., Chapter VI - Recommendations.

² See for example the comments on education in the 1968 and 1969 Alberta Budget Speeches and in Alberta, Post Secondary Education until 1972, Department of Education, January, 1970.

With these views in mind, it seems appropriate to turn to an examination of the most recent studies which have contributed theoretical justification and empirical proof to the contention that higher education contributes significantly to economic growth.

A critical examination of the assumptions and main conclusions of some of the major studies using the residual approach and the rate of return approach will be undertaken in following sections.¹ These approaches lend themselves in particular to this analysis because they are designed, at least in part, to help answer the queries posed in the introduction to this chapter.

(a) Residual Approach

(i) Techniques and Findings

In this approach, the total increase in measurable inputs (usually capital and labour) is compared with the measured output (usually gross national product) over time. A residual usually results from this exercise as the growth in inputs tends to be smaller than the growth in output. A portion of this residual

¹ For a review of other approaches that have been taken in this area, see Robinson, "Government Expenditures . . .", op. cit., p. 394; and Bruce W. Wilkinson, Studies in the Economics of Education, Canada, Department of Labour, Occasional Paper No. 4, (July, 1965), Chapter One.

growth is usually attributable to unspecified inputs. Education and advances in knowledge are usually regarded as the most important of these inputs.¹

Edward Denison in a comprehensive study² has refined the residual approach so that he is able to estimate the contribution of education to growth via its impact on the improvement in the quality of labour inputs. He estimates that education contributed to 23 per cent of the growth in national income in the United States over the period 1929-57. Denison's estimates are based on the assumption that three-fifths of the reported income differentials between adult males of equal age were due to differences in education as distinct from other characteristics associated with increased earnings (such as innate ability). Insofar as higher education is concerned, Denison did not isolate its specific contribution but noted that it would be greater than the lower levels of education because the income differentials associated with higher education were larger.

¹ For a more detailed review of the conceptual underpinning of this approach see: Gordon W. Bertram, The Contribution of Education to Economic Growth, Economic Council of Canada, Staff Study No. 12 (Ottawa: Queen's Printer, 1966), Chapter 3.

² Edward F. Denison, The Sources of Economic Growth in the United States and the Alternative Before Us (New York: Committee for Economic Development, 1962).

In a Canadian study employing techniques quite similar to the Denison work, Bertram noted that for the period 1929-57 the contribution of education to the growth in national income was estimated as 11.4 per cent.¹ The major policy implication of his work was that Canada must develop its educational capabilities as a pre-requisite to maintaining or accelerating productivity growth.²

In a more recent Canadian study for the Royal Commission on Taxation, Thomas Wilson and Harvey Lithwick used the residual approach to estimate education's contribution to economic growth. Employing a somewhat different technique than Denison for measuring time spent in schooling but employing the same assumption as Denison that 3/5 of reported income differentials is attributable to education, they find that education accounts for only 5% of the growth rate in Canada as compared to 12% in the United States.³ Though Wilson and Lithwick did not attempt to measure the specific contribution of

¹ Gordon W. Bertram, op. cit., p. 56.

² Ibid., p. 62.

³ Thomas A. Wilson, and N. Harvey Lithwick, The Sources of Economic Growth, A Study of the Royal Commission on Taxation (Ottawa, Queen's Printer, 1968), p. 94. The U. S. figure of 12% corresponds to Denison's 23% adjusted for the study's method of measuring time in school.

higher education, they noted its impact on a pace of technical advance and concluded on the basis of recent estimates of high rates of return on investment in such education in the United States and Canada that there was room for considerable expansion of investment in higher education in Canada.¹

(ii) Weaknesses

The residual approach, and in particular Denison's work, has been criticized on a number of points. This brief review will cover some mechanical criticisms and comment as well on the adequacy of this approach in determining the future allocation of funds to higher education.²

A first weakness which is worth examining is the Denison assumption [and one which entered into the Canadian studies] dealing with the amounts of income differentials due to schooling and to other characteristics. Denison guessed that the income differentials should be attributed sixty per cent to education and forty per cent

¹ Ibid., p. 106.

² For a more detailed review of criticisms of the mechanics in the Denison approach see Wilkinson, op. cit., p. 26-27.

to other factors (such as innate talent, energy, motivation). There seems to be little evidence available to verify this assumption.¹

A change in the relative weights has an important influence on the final calculation of the effect of education on growth.

Some criticisms question the adequacy of current estimates of educational input and output. There is reason to believe that the numbers of days spent in school - or even the numbers of hours spent in school - is an inadequate measure of educational input. Wilson and Lithwick note that there is no indication that the number of days of schooling has any direct effect on labour's productivity as measured by earnings.² Furthermore, employing the number of graduates as a measure of educational output would seem to omit the quality variable in the educational function. What results, in Robinson's view, is an incomplete explanation of the complex functional relationship between higher education and growth. He notes that

¹ This criticism noted in Seymour E. Harris and Alan Levensohn (ed.), Education and Public Policy, (Berkley: McCutchan Publishing Company, 1965), p. 337.

² Wilson and Lithwick, op. cit., p. 93. This criticism is also noted in Harris and Levensohn, op. cit.

"even if it were accepted that more education had led to a higher level of national output in the past, little could be said about education and further increases in the national product without knowing the shape of the education function. "¹

He notes as prerequisites to a properly specified education function estimations of the contributions of graduates from different disciplines to account for interdependencies and of the optimum mix of educational expenditures among disciplines. He concludes that:

"... there is no simple functional relationship between higher education and economic growth that would justify the use of higher education by a government as an instrument with which to pursue the objective of increasing economic growth. "²

Another criticism rests on the suitability of this approach as a guide to the problem of what quantity of resources should be devoted to education in the future. ³ It is not simply enough to know that education contributes to economic growth. A national allocation of resources among education and other uses demands knowledge on the rate of return to society on funds invested in education. On this point, the residual approach is lacking. The following section will review the rate of return approach which

¹ Albert J. Robinson, University Expenditures and Public Policy, A paper prepared for the Second Annual Meeting of the Canadian Economics Association, Calgary, June, 1968, p. 8.

² Ibid., p. 14.

³ Bruce Wilkinson, op. cit., p. 27.

attempts to provide objective information to make this allocation decision.

(b) Rate of Return Approach

(i) Technique

The Denison and Bertram residual approach to higher education and growth is designed to emphasize mainly the role of education as a factor influencing the quality of the labour force and as a significant source of past productivity growth¹. This approach provides little assistance, however, in answering a key allocative question - given that higher education does promote growth, just what amounts should be devoted to its promotion relative to alternative investments? The rate-of-return approach is designed to help answer this question. As Schultz indicates, this concept is the economist's key in solving the problem of allocating resources:

"... the solution is in equalizing the rates by always allocating investment resources in favour of the highest rate of return. "2

He remarks also that the advantages of this concept are that it has a firm foundation in economic theory, it is applicable to both private and public allocative decisions, in practical economic affairs it is widely used and understood, and it leads to efficient allocations when all investments are made in accordance with the priorities

¹ Bertram, op. cit., p. 62.

² Schultz, op. cit., p. 335.

set by the relative rates of return on alternative investment opportunities.¹

Two rates-of-return, one private and one social, can be estimated for investment in higher education. From the individual's point of view, that is to say the private return, a money rate of return from higher education can be determined by assessing the costs of additional years of schooling and comparing them with estimated (discounted) lifetime earnings. A second rate-of-return can be estimated which considers the return which society as a whole might reap from investment in the education of its citizens. This necessarily involves an assessment of the public costs and benefits of higher education investment.

A comparison of these two rates can be helpful from a public policy point of view. If it can be shown that the private rate of return is substantially above the social rate of return, that is to say the individual benefits more from the investment than does society, then caeterus paribus, the individual should pay the largest cost of the investment. If, however, the social or public returns from investment in higher education are great,

¹ Ibid.

"... the individual who makes the investment would not reap the full benefit of his investment and therefore might not have sufficient incentive to invest in himself up to the point at which the rate of return on this investment to the community would be equal to the rate of return the community receives on its other investments."¹

If this is the case, then society benefits by subsidizing investment in higher education by transferring resources into education from relatively less productive uses.

The statistics of Chapter Three indicate that government sector investment in higher education in Alberta has risen steadily through the 1960s. If in fact such investment is undertaken in view of its desirable effect on economic growth then implicitly the government sector must believe that at this point in time the social rate-of-return exceeds the private rate-of-return. To help verify this seemingly implicit assumption, a short review of recent empirical work undertaken in this area follows in the next section along with some comments on the reliability of this particular approach.

(ii) Findings

Gary S. Becker² has estimated private and social rates-of-return on investment in education in the United States. He found

¹ Robinson, "Government Expenditures . . . , " op. cit. , p. 397.

² Gary S. Becker, Human Capital, (New York: National Bureau of Economic Research, 1964).

that the private rates exceeded 12 per cent per annum in the case of university education for the period 1929-1957.¹ An individual's costs include current expenses and foregone earnings while attending university. Benefits are based on the after-tax income in excess of the income of a person with only high school education. This income differential was adjusted for those factors other than education such as personal motivation which have also an impact on earnings.

Becker found that the social rate of return on a university education was between 8 and 11 per cent per annum in the United States.² This falls within the range of returns on business capital. Costs involved in this calculation include the sum of a university student's private expenses (including his foregone earnings), and the costs borne by governments and other sources, such as current educational expenditures, capital consumption, foregone earnings from employed capital, and property taxes that would have been levied if schools were not exempt.

In Canada, calculations by J. R. Podoluk have shown that private returns on investment in university education were about 20 per cent³ in 1961. Benefits were measured as gross earnings

¹ Ibid, p. 121.

² Ibid,

³ J. R. Podoluk, Earnings and Education, (Ottawa: Dominion Bureau of Statistics, December 1961), pp. 111-117.

before taxes. Cost calculations included foregone earnings (less scholarships), tuition, books and transportation. No adjustments were made for removing the effects of those factors other than education that effect the determination of additional earnings.

More recently, David Stager has estimated social and private monetary returns to post-secondary education in Ontario for the period 1960-64.¹ The author estimated monetary returns to higher education in terms of net present values, benefit cost returns and internal rates of return. He assumes that earnings are an acceptable measure of the social monetary returns to education.² Earnings are adjusted for other factors that influence them other than education and are based on after-tax income.

Table 10-1 summarizes the author's findings. It is to be noted that though there is a substantial net monetary return to investment in post-secondary education in Ontario, the results are strongly affected by both the particular set of assumptions and evaluation method employed. As the author points out,

¹ David Stager, Monetary Returns to Post-Secondary Education in Ontario, 1960-64, A paper presented to the Société Canadien de Science Economique, 9 October 1969, at the University of Ottawa.

² Ibid., p. 8.

Table IV-1¹

SOCIAL AND PRIVATE RETURNS TO EDUCATION BEYOND HIGH SCHOOL,
 MALES, BACHELOR AND FIRST PROFESSIONAL DEGREES², ONTARIO, 1961

Alternative Assumptions	Discount Rate:	Net Present Values ³			Benefit/Cost Ratio			Internal Rates of Return
		0%	5%	10%	0%	5%	10%	
<u>Social Returns</u>								
1. Assuming 100 per cent of income differential due to education alone		\$128, 000	\$28, 600	\$4, 500	10. 1	3. 3	1. 4	12. 5%
2. Assuming 67 per cent		79, 300	14, 300	-1, 100	6. 6	2. 1	0. 9	9. 4
3. Assuming 60 per cent		79, 300	11, 300	-2, 300	5. 9	1. 9	0. 8	8. 6
<u>Private Returns</u> ⁴								
1. Assuming 100 per cent of income differential due to education alone		103, 600	26, 000	6, 400	13. 3	4. 5	2. 0	15. 4
2. Assuming 67 per cent		66, 500	14, 600	1, 800	8. 8	2. 9	1. 3	11. 7
3. Assuming 60 per cent		60, 200	12, 800	1, 000	8. 0	2. 7	1. 2	11. 0

¹ David Stager, Monetary Returns to Post-Secondary Education in Ontario, 1960-64.

A paper presented to the Société Canadienne de Science Economique, 9 octobre, 1969, at the University of Ottawa, Table IV, p. 28.

² Average for all Faculties, weighted by number of degrees granted in each Faculty, Ontario Universities, 1962-63.

³ Rounded to nearest 100 dollars.

⁴ After income tax deductions.

"the question whether the social or the private net present value is greater depends on the proportion of earnings attributed to education and the discount rate used. Furthermore, for all cases of these two factors the private benefit cost ratios and internal rates of return exceed the social returns and rates, while this is not true for the net present values."¹

(iii) Weaknesses

The rate-of-return approach is essentially an example of cost-benefit analysis. This sort of analysis requires that decisions be made on which costs and benefits to evaluate, on quantifying these variables and on the selection of interest rates to use in discounting future costs and benefits.

Schultz notes that the difficulty in applying this approach to education is that most of the information necessary for intelligent decision-making at each step is not readily available.² On the cost side, earnings foregone, depreciation and university research are singled out as difficult areas for estimation. On the benefit side, there seems to be little or no economic information on pecuniary and non-pecuniary returns to guide choices.³ The following paragraphs

¹ Ibid., p. 27.

² Schultz, op. cit., p. 335-336.

³ Ibid., p. 336.

will briefly review some of these difficult areas with particular reference to the studies cited in the previous section.

The problems tend to resolve themselves into two general areas - estimation and conceptual. The problems of estimation relate to calculations of costs and benefits for both private and social rates of return. Conceptual problems may relate to both calculations but where necessary distinctions may be drawn between the two. On the cost side, since foregone earnings represent probably the largest portion of the total costs in obtaining an education it is important that they be accurately estimated.¹ This component is usually estimated for university-age students by computing the average earnings of high school graduates in the relevant age groups and subtracting from these earnings an estimate of the average earnings of university students from part time and summer employment.² This procedure ignores the possibility that had the enrolled students entered the labour force their average earnings would have been higher due to among other things greater motivation and ability. To the extent that this is the case, failing to take account of this

¹ Theodore W. Schultz, Economic Value of Education (New York: Columbia University Press, 1963), p. 29. His estimates of such costs range from 54% in U. S. to 81% in Venezuela.

² This is generally the procedure followed by Podoluk and Stager.

factor would lead to an underestimation of opportunity-costs.¹

Other problems in relation to estimating foregone earnings include estimating the possible increase in national income that might result if individuals had been earning income and investing a portion of it and estimating the cost of women staying out of the labour force. There would seem to be, at any rate, a downward bias in the estimates of foregone earnings though the magnitude of the deviation is difficult to assess. As Wilkinson points out, this simple calculation can only be regarded as a first approximation to the correct value of this cost.² A downward bias in the earnings foregone figures implies that the private rate of return is higher than it might be.

On the benefit side, the calculation of expected lifetime earnings, which is the accepted method of measuring the economic benefits of higher education, is fraught with difficulty. The lack of time-series data on the actual lifetime earnings of individuals with specified educational backgrounds in different occupations necessitates a second-best approximation of this benefit. Lifetime earnings are presently estimated on the actual earnings of various

¹ Stager takes account of this factor by assuming gross foregone earnings were 116% of the average for all high school graduates.

² Wilkinson, op. cit., p. 13.

education groups by age which are derived from cross-sectional data. Podoluk and Stager estimates, for example, are based on 1961 census data.

More important, however, is the fact that it is not known the extent to which higher incomes associated with additional incomes are due to the extra education or whether they are the result of a collection of other factors such as on the job training and innate ability. Though estimates have been made of the importance of these factors,¹ Stager in his relatively comprehensive study simply assumes that post-secondary education accounts for either 100 per cent of the earnings differential, and 67 per cent of the differential or finally, 60 per cent. As his results clearly indicate (see Table IV-1), both the private and social rates of return under all three methods of calculation employed are remarkably sensitive to this assumption.

Should future benefits be properly specified and estimated there still remains a problem of choosing an appropriate interest rate at which to discount them. The usual practice, it would seem, is to select rates prevailing at the time.² Stager's work reveals (see Table IV-1) that social and private rates of return calculated by the net present value and benefit/cost ratio methods are extremely sensitive to the choice of discount rate so that it seems important

¹ As pointed out by Wilkinson, op. cit., p. 21.

² Stager, op. cit., p. 10.

to have some justification for this choice.¹

Perhaps the single most telling criticism about the rate of return approach has to do with the treatment of non-pecuniary returns to education. From an individual's point of view such benefits include presumably greater job mobility and heightened cultural awareness. From society's point of view, non-monetary benefits might include a more intelligent electorate and a greater civic pride and responsibility². Any estimates of such benefits are speculative and highly subjective at best. Yet from an individual's point of view, such benefits may be of tremendous significance and their elimination from rate-of-return estimates may lead to a lower rate than the "true" one.

From society's point of view, the estimation problems are no less severe nor less subjective and speculative. Wilkinson distinguishes at least two ways in which these benefits may be handled.

"Monetary tags may be attached to them with the result that the returns to educational investments would soar. Alternatively, that portion of the outlay on education which gives rise to such benefits may be treated as consumption spending. Then, the investment component having been lowered considerably the true monetary yield from this component would again produce an extraordinarily high rate-of-return. . . " ³

¹ It has been argued that insofar as the choice of an appropriate discount rate for evaluating social rates of return is concerned, that since the rate is meant to reflect the community's evaluation of benefits in the future as compared with present benefits, its determination is a matter of political judgement. Alan T. Peacock and Jack Wiseman, The Economics of Public Expenditure and its Consequences for Parliamentary Control (York: Institute for Social and Economic Research, 1970), p. 255.

² Noted in Wilkinson, op. cit. , p. 24.

³ Ibid. , p. 24.

The implication is that by including non-monetary benefits in the calculation of social rates of return means "one can prove anything one wants to"¹. The difficulties of assigning values to subjective components and the lack of a rigorous analytical framework for treating them leads to a conclusion that employing calculated social rates of return for justifying expenditures on higher education is a dubious practice.

Some Concluding Comments

The intent of this chapter was to review the economic justification for government expenditure in the field of higher education in terms of three general objectives of government revenue and expenditure programmes: stability, income redistribution and growth.

Both conceptually and on the basis of available empirical work, expenditures on higher education do not seem to directly contribute to the attainment of the first two objectives. Justification would seem to rest on the growth argument.

A review of studies employing the residual approach indicates that though the method is still in many respects statistically and conceptually weak, there seems to exist a fairly strong relationship between higher education and growth. That is to say, for some past period

¹ Ibid. , p. 25.

higher education seems to have made a positive contribution to economic growth. However, as Robinson commented, inadequate and incomplete specification of the functional relationship between higher education and growth makes it difficult to say whether in the future expenditures in this field will have a strong or weak impact on growth. This approach, moreover, says nothing about the beneficiaries of growth - is it the individual or society that benefits? In the context proper of this study, the implication is that there is little in this approach to help the public sector decision-makers decide whether or not massive higher education expenditures forecasts for the 1970s will promote growth in that decade.

A second set of studies, these employing the rate-of-return approach, were reviewed in light of their apparent helpfulness in answering the sort of resource allocation problem facing governments in the 1970s. Presumably if the social rate of return on higher education is greater than those on alternative investments, then the public sector should be investing its funds in that area at least until rates are equalized. The appeal of this approach breaks down when one investigates the formidable estimation problems. The marked sensitivity of the rate of return to two key assumptions on the discount rate and the earnings differential and to the evaluation method employed renders the final figure questionable. Moreover,

the difficulties and dangers associated with the estimation of the non-monetary returns to higher education makes conclusion about social rates-of-return particularly hazardous.

Chapter V

SUMMARY AND CONCLUSIONS

A. Summary

It has been noted that in the province of Alberta in the last decade, large absolute increases in the number of individuals in the 18-24 age group and the rising rate of participation of that group in post-secondary education, led to extensive demands for places at university-level institutions. The results of these demands were reflected in the tremendous expansion of post-secondary institutions in the province of Alberta during the 1960 s. It was also noted that over the course of the decade as expenditure pressures mounted in response to "consumer" demand and also as the result of a host of other factors the share of the financing burden shifted increasingly from private hands to the public purse.

On the basis of the social-demand method of forecasting, it was concluded that strong "consumer" demand for higher education will continue throughout the 1970 s. The need to provide places will likely mean a repetition of the same sorts of expenditures pressures that characterized the 1960 s. Assuming simply that the private-public share of the financial burden maintains the same ratio as the late

1960s, then the public share will continue to accelerate in large, absolute amounts. Given that the rate of growth of expenditure on higher education has tended to be higher than the corresponding rates of growth in total government expenditure, it seems clear that in the 1970s, assuming present policies of accommodating consumer education demands continue, expenditures on higher education are likely to take an increasing share of the total government budget.

This forecast of rising government expenditures on higher education comes at a time when there are especially strong competing demands on government resources. Alleviating poverty, the prevention of the pollution of the environment, and urban congestion and decay create obvious and important problems of resource allocation. In terms of efficiency in the allocation of resources it thus becomes instructive to cast expenditure programmes in terms of achievement of explicit public sector objectives.¹ With this view in mind, Chapter 4 examined government sector contributions to higher education in

¹ For an elaboration of this point of view see: Organization for Economic Cooperation and Development, The Outlook for Economic Growth (Paris: Organization for Economic Cooperation and Development, 1970), pp. 33-39.

terms of three generally accepted economic objectives of government expenditure. The available evidence is inconclusive on the question of whether or not higher education expenditures contribute to stability and income redistribution objectives.¹ Justification for such expenditures it would seem, rests on the connection between economic growth and higher education. Government involvement on economic grounds presupposes, among other things, a social rate of return that exceeds private rates of return. Yet, it was noted that calculations of both rates of return and in particular the social one, are subject to important subjective judgements as to the appropriate values of the variables used in the calculation. At this point it would seem that much more work remains to be done before a definitive economic justification or refutation can be provided for public support to higher education.

B. Conclusions

The motivation for this thesis stems from a concern with the efficiency of the resource allocation process in the public sector. A spur to this motivation was the realization that expenditures on higher

¹ Intuitively it would seem that a student grant system could be devised which would act as a powerful aide to reducing present cost barriers to higher education for individuals from lower income families.

education likely would continue to grow rapidly throughout the current decade. In light of increasingly important demands on scarce government resources, it is imperative that public decision-makers examine the purposes and objectives of public support of various expenditures. The work of Chapter 4 indicates that there is reason to believe that government should provide some financing assistance for higher education expenditures. However, the degree of support is by no means clearly established. Certainly, on economic grounds alone it seems difficult to justify continuing almost ad hoc responses to higher education needs.

It is recognized that there are a host of non-economic objectives that are taken into account in the decision-making process. The social goal of equality of opportunity is raised to justify higher education expenditures.¹ Social cohesion, also a social objective, is sometimes raised as a justification for public support.² Such social objectives are dependent upon value judgements and are difficult to evaluate by positive analysis. However, they must be taken into

¹ Burton A. Weisbrod, "Education and Investment in Human Capital", Journal of Political Economy, LXX, (Supplement: October, 1962), pp. 119-120.

² C. K. Rowley, "The Political Economy of British Education", Scottish Journal of Political Economy, XVI, (June, 1969), pp. 170-173.

account when resource allocation decisions are made.

It is encouraging that the Alberta government has opted for a comprehensive review of the objectives of government expenditure on education. In creating the Commission on Education Planning, the Government seems to have been motivated not only by some of the concerns noted above but also by the realization that in some respects the output of higher education institutions is not geared to society's needs.¹ It is to be hoped that the Commission provides a clear elucidation of costs and benefits in the field of higher education so that the public decision-makers might make a reasonable judgement in light of possible spending alternatives.

¹ For further comment on the output versus need problem see: Toronto Globe and Mail, May 14, 1970, p. 5; Gordon J. Swanson, "Education for the World of Work", Designing Education for the Future #2, ed. Edgar L. Morphet and Charles O. Ryan, (New York: Citation Press Co, 1967), Chapter 6; Arthur M. Smolensky Employment Opportunities for Graduate Students, A Report to the Association of Universities and Colleges in Canada (Vancouver: University of British Columbia Graduate Student Association, November, 1969).

APPENDIX

Table A-1

TOTAL UNIVERSITY ENROLLMENT IN ALBERTA,
ACTUAL AND PROJECTED

(Based on Trend of Past 11 Years)

Linear Regression

	Academic Year <u>Beginning</u>	18-24 Age Group Estimate		Enrollment As a % Of 18-24 <u>Age Group</u>	Total Graduate and Under- Graduate Enrollment Estimate	
		<u>1</u>	<u>2</u>		<u>1</u>	<u>2</u>
	1959		121.2	5.13		6,215
	1960		123.6	5.88		7,268
A	1961		126.7	6.71		8,499
C	1962		130.2	7.56		9,837
T	1963		135.0	8.21		11,079
U	1964		138.5	9.37		12,977
A	1965		143.7	10.26		14,749
L	1966		153.0	11.10		16,983
	1967		158.0	12.46		19,688
	1968		167.8	14.12		23,700
	1969		178.8	16.78		30,000
	1970	178,190	181,058	15.58	27,762	28,209
P	1971	185,775	189,114	16.66	30,950	31,506
R	1972	192,540	196,268	17.73	34,137	34,798
O	1973	199,620	203,756	18.81	37,549	38,327
J	1974	208,768	213,330	19.88	41,503	42,410
E	1975	216,601	221,611	20.96	45,400	46,450
C	1976	225,496	231,002	22.03	49,677	50,890
T	1977	233,542	239,593	23.11	53,972	55,370
E	1978	240,629	247,257	24.18	58,184	59,787
D	1979	244,973	252,205	25.26	61,880	63,707
	1980	248,796	256,655	26.33	65,508	67,577

Source: See Tables II-2 and II-4.

Table A-2

TOTAL UNIVERSITY ENROLLMENT IN ALBERTA,
ACTUAL AND PROJECTED

(Based on Trend of Past 6 Years)

Linear Regression

	Academic Year Beginning	18-24 Age Group Estimate		Enrollment As a % Of 18-24 Age Group	Total Graduate and Under- Graduate Enrollment Estimate	
		1	2		1	2
A	1964		138.5	9.37		12,977
C	1965		143.7	10.26		14,749
T	1966		153.0	11.10		16,983
U	1967		158.0	12.46		19,688
A	1968		167.8	14.12		23,700
L	1969		178.8	16.78		30,000
	1970	178,190	181,058	17.35	30,916	31,414
P	1971	185,775	189,114	18.78	34,889	35,516
R	1972	192,540	196,268	20.20	38,893	39,646
O	1973	199,620	203,756	21.63	43,178	44,072
J	1974	208,768	213,330	23.06	48,142	49,192
E	1975	216,601	221,611	24.49	53,046	54,273
C	1976	225,496	231,002	25.92	58,449	59,876
T	1977	233,542	239,593	27.35	63,874	65,529
E	1978	240,629	247,257	28.77	69,229	71,136
D	1979	244,973	252,205	30.20	73,982	76,166
	1980	248,796	256,655	31.63	78,694	81,180

Source: See Tables II-2 and II-4.

Table A-3

FULL-TIME UNDERGRADUATE ENROLLMENT AS
A % OF 18-21 AGE GROUP

(Based on Trend of Past 6 Years)

Academic Year Beginning		18-21 Age Group (Thousand) Estimate		Enrollment As a % Of 18-21 Age Group	Full-Time Undergraduate Enrollment Estimate	
		1	2		1	2
A	1964		82.2	14.51		11,929
C	1965		86.5	15.54		13,445
T	1966		93.6	16.43		15,380
U	1967		96.4	18.39		17,724
A	1968		102.0	22.01		22,455
L	1969		108.0	24.95		26,950
	1970	105,694	106,809	26.00	27,480	27,770
P	1971	109,685	111,017	28.10	30,821	31,196
R	1972	115,883	117,454	30.20	34,997	35,471
O	1973	122,182	124,012	32.30	39,465	40,056
J	1974	128,831	130,940	34.40	44,318	45,043
E	1975	133,291	135,678	36.51	48,665	49,536
C	1976	136,225	138,921	38.61	52,596	53,637
T	1977	139,686	142,718	40.71	56,866	58,100
E	1978	141,626	145,027	42.81	60,630	62,086
D	1979	144,318	148,116	44.91	64,813	66,519
	1980	145,537	149,732	47.02	68,431	70,404

Source: See Tables II-1 and II-4.

Table A-4

FULL-TIME UNDERGRADUATE ENROLLMENT AS
A % OF 18-21 AGE GROUP

(Based on Trend of Past 6 Years)

	Academic Year Beginning	18-21 Age Group (Thousand) Estimate		Enrollment As a % Of 18-21 Age Group	Full-Time Undergraduate Enrollment Estimate	
		1	2		1	2
	1959		69.0	8.58		5,921
	1960		70.7	9.79		6,918
A	1961		73.6	10.91		8,028
C	1962		75.8	12.11		9,181
T	1963		79.2	12.95		10,254
U	1964		82.2	14.51		11,929
A	1965		86.5	15.54		13,445
L	1966		93.6	16.43		15,380
	1967		96.4	18.39		17,724
	1968		102.0	22.01		22,455
	1969		108.0	24.95		26,950
	1970	105,694	106,809	24.07	25,441	25,709
P	1971	109,685	111,017	25.57	28,046	28,387
R	1972	115,883	117,454	27.06	31,358	31,783
O	1973	122,182	124,012	28.56	34,895	35,418
J	1974	128,831	130,940	30.05	38,714	39,347
E	1975	133,291	135,678	31.55	42,053	42,806
C	1976	136,225	138,921	33.04	45,009	45,899
T	1977	139,686	142,718	34.53	48,234	49,281
E	1978	141,626	145,027	36.03	51,028	52,253
D	1979	144,318	148,116	37.52	54,148	55,573
	1980	145,537	149,732	39.02	56,789	58,425

Source: See Tables II-1 and II-4.

Table A-5

GRADUATE ENROLLMENT AS A % OF
TOTAL UNIVERSITY ENROLLMENT

(Based on Trends of Past 6 Years)

				Graduate Enrollment As a % Of Total Enrollment
Academic Year <u>Beginning</u>	Total University <u>Enrollment</u>	<u>Graduate Enrollment</u>		
A 1964	12,977	1,048		8.08
C 1965	14,749	1,304		8.84
T 1966	16,983	1,603		9.44
U 1967	19,688	1,924		9.77
A 1968	24,922	2,467		9.90
L 1969	30,000	3,050		10.17

		<u>Estimate</u>				
		<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	
	1970	30,916	31,414	3,327	3,380	10.76
P	1971	34,889	35,516	3,894	3,964	11.16
R	1972	38,893	39,646	4,496	4,583	11.56
O	1973	43,178	44,072	5,164	5,271	11.96
J	1974	48,142	49,192	5,950	6,080	12.36
E	1975	53,046	54,273	6,769	6,925	12.76
C	1976	58,449	59,876	7,692	7,880	13.16
T	1977	63,874	65,529	8,661	8,886	13.56
E	1978	69,229	71,136	9,657	9,923	13.95
D	1979	73,982	76,166	10,616	10,930	14.35
	1980	78,694	81,180	11,607	11,974	14.75

Source: See Tables II-4 and II-5.

Table A-6

GRADUATE ENROLLMENT AS A % OF
UNDERGRADUATE ENROLLMENT

(Based on Trend of Past 6 Years)

	Academic Years <u>Beginning</u>	Total Undergraduate <u>Enrollment</u>	<u>Graduate Enrollment</u>	Graduate Enrollment As a % Of Undergraduate <u>Enrollment</u>
A	1964	11,929	1,048	8.79
C	1965	13,445	1,304	9.70
T	1966	15,380	1,603	10.42
U	1967	17,724	1,924	10.86
A	1968	22,455	2,467	10.99
L	1969	26,950	3,050	11.32

		<u>Estimate</u>				
		<u>1</u>	<u>2</u>	<u>1</u>	<u>2</u>	
	1970	27,480	27,770	3,309	3,344	12.04
P	1971	30,821	31,196	3,862	3,909	12.53
R	1972	34,997	35,471	4,553	4,615	13.01
O	1973	39,465	40,056	5,328	5,408	13.50
J	1974	44,318	45,043	6,196	6,297	13.98
E	1975	48,665	49,536	7,042	7,168	14.47
C	1976	52,596	53,637	7,863	8,019	14.95
T	1977	56,866	58,100	8,780	8,971	15.44
E	1978	60,630	62,086	9,652	9,884	15.92
D	1979	64,813	66,519	10,629	10,909	16.40
	1980	68,431	70,404	11,558	11,891	16.89

Source: See Tables II-4 and II-5.

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